Appendix I
Construction Impacts Technical Memorandum

RED AHEAD
Moving Ahead to a Better Red

Red Line Extension

Chicago Red Line Extension Project

Construction Impacts
Technical Memorandum

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Abbreviations

APE	area of potential effect
API	area of potential impact
BMP	best management practices
BRT	Bus Rapid Transit
BTU	British thermal units
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
CN	Canadian National Railroad
CTA	Chicago Transit Authority
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
IDOT	Illinois Department of Transportation
IHB	Indiana Harbor Belt Railroad
ILCS	Illinois Compiled Statutes
JULIE	Joint Utility Locating Information for Excavators
ME	Metra Electric District
MWRD	Metropolitan Water Reclamation District of Greater Chicago
NB	northbound
NEPA	National Environmental Policy Act
NICTD/CSS & SBRR	Northern Indiana Commuter Transportation District/Chicago South Shore & South Bend Railroad
NRHP	National Register of Historic Places
OEMC	Office of Emergency Management and Communications
RLE	Red Line Extension
ROW	right-of-way
UPRR	Union Pacific Railroad
USEPA	United States Environmental Protection Agency
WB	westbound

Section 1
Summary

This technical memorandum analyzes the potential construction impacts of the proposed Red Line Extension (RLE) Project. The analysis draws on the descriptions of construction-related impacts and conclusions described in the other RLE technical memoranda. Section 2 introduces the project, describes the project area, and identifies the alternatives being analyzed in the Environmental Impact Statement (EIS). Section 3 describes the methods of analysis for construction impacts, identifies federal, state and local regulations used in the analysis, identifies analysis thresholds, and describes the area of potential impact (API). Section 4 describes the affected environment. Section 5 describes constructability assumptions and construction segments and phasing. Section 6 describes potential impacts and mitigation measures for each of the RLE alternatives, and Section 7 addresses impacts after mitigation. All RLE alternatives are analyzed in this memorandum. The No Build Alternative would not involve any construction activities, so no construction impacts would occur. Because of the temporary nature of construction activities, the use of construction best management practices (BMP), and the mitigation methods proposed, the construction impacts from the build alternatives would not be adverse.

Updated July 29, 2015

In August 2014, based on the technical analysis and public input until then, CTA announced the NEPA Preferred Alternative—the UPRR Rail Alternative. CTA is considering two alignment (route) options of this alternative: the East Option and the West Option. At this time, CTA is also considering only the South Station Option of the 130th Street Station. In late 2014 and early 2015, CTA conducted additional engineering on the East and West Options to refine the East and West Option alignments. Appendix B of this technical memorandum summarizes the refined alignments and any additional or different impacts that would result. The information in Appendix B supersedes information presented in other chapters of this technical memorandum.

Section 2
Project Description

The Chicago Transit Authority (CTA) proposes to extend the Red Line from the existing 95th Street Terminal to the vicinity of 130th Street, subject to the availability of funding. The proposed RLE would include four stations. Each station would include bus transfer and parking facilities. This project is one part of the Red Ahead Program to extend and enhance the entire Red Line. The CTA is also planning 95th Street Terminal improvements that are anticipated to be completed prior to the proposed RLE construction and are therefore not included in the scope of the RLE Project.

The project area is 11 miles south of the Chicago central business district (commonly referred to as the Loop) and encompasses approximately 20 square miles. The boundaries of the project area are 95th Street on the north, Ashland Avenue on the west, Stony Island Avenue on the east, and the Calumet-Sag Channel/Little Calumet River and 134th Street on the south. The I-57 Expressway and I-94 Bishop Ford Freeway cross the western and eastern edges of the project area, respectively. Lake Calumet is in the eastern portion of the project area. The project area encompasses parts of nine community areas in the City of Chicago and the eastern section of the Village of Calumet Park. Chicago community areas include Beverly, Washington Heights, Roseland, Morgan Park, Pullman, West Pullman, Riverdale, Hegewisch, and South Deering. The project area comprises residential (primarily single family), industrial (both existing and vacant), transportation (including freight), and commercial development.

The Draft EIS focuses on the following alternatives (shown in Figure 2-1), which emerged from the Alternatives Analysis and the National Environmental Policy Act (NEPA) scoping process:

- No Build Alternative
- Bus Rapid Transit (BRT) Alternative
- Union Pacific Railroad (UPRR) Rail Alternative
  - Right-of-Way (ROW) Option
  - East Option
  - West Option
- Halsted Rail Alternative

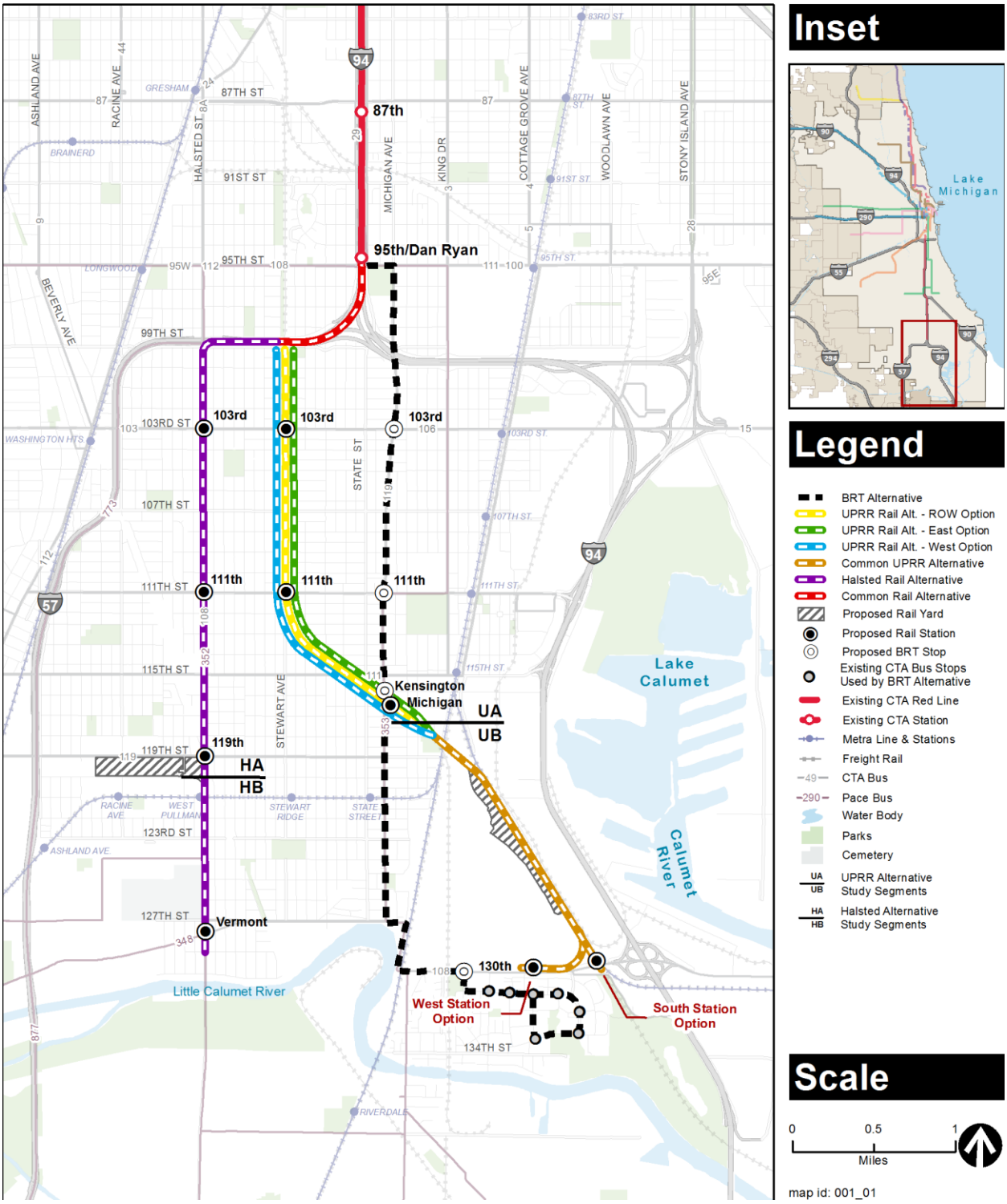

Figure 2-1: Red Line Extension Project Alternatives

The No Build Alternative is a required alternative as part of the NEPA environmental analysis and is used for comparison purposes to assess the relative benefits and impacts of extending the Red Line service. The No Build Alternative is carried into the Draft EIS phase of the project development regardless of its performance versus the build alternatives under consideration. No new infrastructure would be constructed as part of the No Build Alternative other than committed transportation improvements that are already in the Chicago Metropolitan Agency for Planning Fiscal Year 2010–2015 Transportation Improvement Program including the improvements to 95th Street Terminal. The Transportation Improvement Program projects within the project area consist of four bridge reconstructions, several road improvement projects including resurfacing and coordination of signal timing on 95th Street, work on Metra's facilities, construction of a bicycle/pedestrian multi-use trail, and preservation of historic facilities. The No Build Alternative includes regular maintenance of existing track and structures, and bus transit service would be focused on the preservation of existing services and projects. All elements of the No Build Alternative are included in each of the other alternatives. Under this alternative, travel times would not improve from existing conditions.

The BRT Alternative (formerly referred to as the Transportation Systems Management Alternative) is a 5.0-mile, limited-stop, enhanced BRT route, which is assumed to operate 24 hours per day between the existing 95th Street Terminal and the intersection of 130th Street and Eberhart Avenue. No dedicated bus lanes would be provided for the BRT Alternative; however, parking lanes would be removed for some portions of the alignment and four stops with improved bus shelters and park & ride facilities would be created at 103rd Street and Michigan Avenue, 111th Street and Michigan Avenue, Kensington Avenue and Michigan Avenue, and 130th Street and Eberhart Avenue. Although BRT service elements would not continue south of the 130th Street stop, the bus route would continue through Altgeld Gardens along the existing route with six stops. The BRT Alternative would be consistent with bus routing changes that may occur as part of improvements to the 95th Street Terminal. Under this alternative, travel times between 130th Street and the Loop would improve over existing conditions.

The UPRR Rail Alternative is a 5.3-mile extension of the heavy rail transit Red Line from its existing 95th Street Terminal to 130th Street, just west of I-94. The Chicago Transit Board designated the UPRR Rail Alternative as the Locally Preferred Alternative at its August 12, 2009 board meeting. This alternative includes construction and operation of new heavy rail transit tracks, mostly in existing transportation corridors. The UPRR Rail Alternative has three options for alignment (ROW, East, and West), all of which would include operation on elevated structure from 95th Street to just past the Canadian National/Metra Electric District (CN/ME) tracks near 119th Street. The alignment would then transition to at-grade through an industrial area with no public through streets, terminating at 130th Street in the vicinity of Altgeld Gardens. Four new stations would be constructed at 103rd Street, 111th Street, Michigan Avenue, and 130th Street. The 130th Street station would be the terminal, with two options under evaluation: the South Station Option and the West Station Option. A new yard and shop facility would be sited near 120th Street and Cottage Grove Avenue. The bus routes in the vicinity of the UPRR Rail Alternative would be modified to enhance connectivity between the Red Line and the bus network. The hours of operation and service frequency for the UPRR Rail Alternative are assumed to be the same as

the current Red Line. Under this alternative, travel times between 130th Street and the Loop would improve substantially over existing conditions.

The Halsted Rail Alternative is a 5.0-mile heavy rail transit extension of the existing Red Line. In this alternative, the Red Line would operate on an elevated structure running south from 95th Street along I-57 until Halsted Street. The alignment would then turn south and continue along Halsted Street to the intersection of Halsted Street and Vermont Avenue near 127th Street. This alternative would include four new stations at 103rd Street, 111th Street, 119th Street, and Vermont Avenue. The Vermont Avenue station would be the terminal. A new yard and shop would be sited west of Halsted Street and between the 119th Street and Vermont Avenue stations. The bus routes in the vicinity of the Halsted Rail Alternative would be modified to enhance connectivity to the Red Line. The hours of operation and service frequency for the Halsted Rail Alternative are assumed to be the same as for the current Red Line. Under this alternative, travel times between 127th Street and the Loop would improve substantially over existing conditions. This alternative would not extend rail to Altgeld Gardens, which would be served by bus connecting to the Vermont terminal.

Section 3
Methods for Impact Evaluation

This section describes the process used to conduct a macro-level analysis of potential direct and cumulative impacts of construction activities associated with the proposed project. The regulatory framework for the analysis is presented in this section and the potential options to avoid, minimize, and mitigate adverse impacts are discussed in Section 6. Future NEPA analysis, if required for the RLE Project, may provide project-specific analysis of impacts and may provide specific details about the mitigation measures agreed upon by CTA and other project stakeholders.

3.1 Federal Regulations

The project-specific analysis of impacts for the RLE Project is documented in technical memoranda that cover the NEPA resources identified below. The regulatory frameworks relevant to each of these resources are documented in the respective memoranda. Part of the regulatory framework can be applied to construction impacts. The regulatory frameworks for the following resources apply, in part, and are included herein by reference:

- Land Use and Economic Development
- Displacements and Relocation of Existing Uses
- Neighborhood and Community Impacts
- Parklands and Community Facilities
- Visual and Aesthetic Conditions
- Noise and Vibration
- Safety and Security
- Historic and Cultural Resources
- Hazardous Materials
- Air Quality
- Water Resources
- Vegetation and Wildlife Habitat
- Energy
- Environmental Justice
- Transportation

3.2 State Regulations

In addition to the regulatory framework discussed in the other technical reports, the following state regulations apply to construction activities:

- Chapter 15 of 625 ILCS (Illinois Compiled Statutes) 5 - Illinois Vehicle Code includes statutes regarding the maximum size and weight of vehicles that can be lawfully operated throughout Illinois and the network of routes over which these vehicles may operate. Article I describes vehicle size, weight, and load. Article II describes enforcement and recording of weight limit violations. Article III explains special permitting needed to operate or move a vehicle or combination of vehicles of a size or weight of vehicle or load exceeding the maximum specified in this Act.

- The Illinois Department of Transportation's (IDOT) Standard Specifications for Road and Bridge Construction include provisions for dust control. Under these provisions, dust and

airborne dirt generated by construction activities would be controlled through dust control procedures or a specific Dust Control Plan, when warranted. In addition, IDOT has developed construction-related Special Provisions dealing with the use of cleaner diesel fuel, idling reduction requirements for construction equipment, and the installation of emission control devices on contractor vehicles.

- Section 5 of 415 ILCS 5 - (Illinois Environmental Protection Act) establishes the Illinois Pollution Control Board. This independent board determines, defines, and implements the environmental control standards applicable in the State of Illinois and may adopt rules and regulations in accordance with Title VII of the Environmental Protection Act. Title 35 of the Illinois Administrative Code contains the Board's substantive pollution control standards and regulations, and the Illinois Environmental Protection Agency's rules for administering the pollution control program. Part 1100, Clean Construction or Demolition Debris, is among the provisions of Title 35 that pertain to construction impacts.

3.3 Local Regulations

The following parts of the Municipal Code of Chicago codify various noise, water quality, air quality, and construction permitting requirements in the City of Chicago. (Regulatory requirements for parts of the project area outside the City of Chicago also apply.)

- Title 9, Chapter 9-72, Section 30 codifies authority to "determine and designate streets or parts of streets upon which the operation of trucks or other commercial vehicles shall be prohibited or upon which the operation of such vehicles shall be restricted by imposing limitations as to the weight of such vehicles." It also requires that "appropriate signs will be erected and maintained on such streets or parts of streets." Section 35 authorizes vehicle weight limitations computed under subsection (g) of Section 15-111 of the Illinois Vehicle Code. These limitations are similar to those imposed by the State of Illinois on "portions of streets and highways under local jurisdiction and will be authorized on designated arterial streets and industrial access routes". Sections 40, 50, and 60 set "the maximum width of any vehicle at 8 feet, the maximum height of any vehicle at 13 feet, 6 inches, the maximum length of single vehicles at 42 feet, and the maximum length of truck tractor and semi-trailer at 55 feet." Section 70 provides "permitting for a vehicle or combination of vehicles not in conformity with the size regulations of this chapter or the wheel and axle load and gross weight provisions of Section 15-111 of the Illinois Vehicle Code."
- Title 11, Chapter 11-16, Section 120 prohibits discharging "any prohibited wastes as defined by the Metropolitan Water Reclamation District of Greater Chicago (MWRD), the department of health or any other governmental agency, or any other material which the commissioner determines is likely to obstruct or stop the flow of wastewater in the public sewer system."

3.4 Impact Analysis Thresholds

NEPA does not set specific thresholds of significance for construction-related impacts; however, there are construction-related thresholds of significance for some of the NEPA resources included in this analysis. The analyses for various resources were used as the basis for the qualitative and

quantitative evaluations referenced in this document, and to determine the thresholds of significance for each resource.

For this analysis, the impact categories are as follows:

- **Beneficial** - Impact that positively affects the community.
- **No Impact** - No adverse or beneficial impact on the resource would result.
- **Not Adverse** - Would not result in a negative impact on the resource.
- **Not Substantially Adverse** - A negative impact on the resource would result, but it would not be severe, or it could be mitigated to minimize the impact.
- **Adverse** - Negative impact to the community that cannot be mitigated.

For the purpose of this EIS, a construction impact would occur if an impact threshold identified for any of the resources were to be exceeded during proposed construction activities.

3.5 Area of Potential Impact

Two kinds of construction impacts are considered in determining the API for a project. Direct impacts are caused by the proposed project and occur at the same time and place (40 Code of Federal Regulations [CFR] 1508.8). They are immediately related to project activities, and include impacts that result from construction, such as construction noise. Direct impacts occur at facilities and adjacent to the project. Cumulative impacts are those that result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR 1508.67).

The API for direct impacts due to construction is based on the API for the NEPA resources analyzed. The largest geographic API for direct impacts due to construction is generally bounded on the north by 91st Street; on the south by 134th Street; on the east by Martin Luther King Drive (91st Street to 99th Street) and I-94 (99th Street to 134th Street); and on the west by Halsted Street (91st Street to 95th Street), Racine Avenue (95th Street to 99th Street), and I-57 (99th Street to 134th Street). Direct impacts due to construction and construction-related traffic in this area would primarily affect traffic patterns and land uses along roadways classified as principal and minor arterials, and major and minor collectors. In subsequent phases of the RLE Project, design activities would identify potential locations of material sources, contractor storage and staging areas, and other details that determine construction access routes.

The mid-size API applied for direct impacts due to construction is primarily relevant for non-motorized travel, including pedestrians and bicyclists. One-half mile is a generally accepted distance for travel by non-motorized means for analyses such as land use and economic development impacts, neighborhood and community impacts, and parklands and community facilities impacts. The mid-size API is defined as follows for the respective alternatives:

- **BRT Alternative** - Extends ½ mile on each side of the center of the proposed alignment, from the 95th Street Terminal to the station location at 130th Street and Eberhart Avenue.
- **UPRR Rail Alternative** - Extends ½ mile on each side of the center of the proposed alignments, from the 95th Street Terminal to the 130th Street station location.
- **Halsted Rail Alternative** - Extends ½ mile on each side of the center of the proposed alignment from the 95th Street Terminal to the 127th Street/Vermont Avenue station location.

The smallest APIs are based on unique characteristics of a specific site or sites. A micro-level API is used for analysis of construction impacts on site-specific environmental resources. An example of construction impacts on a site-specific environmental resource includes construction noise and vibration impacts on a historic site adjacent to the RLE alignment. When otherwise not specifically stated, the API for direct impacts due to construction noise includes parcels within 600 feet of the existing and proposed ROWs for the each of the alternatives (Chicago City Code Section 11-4-2835).

The area used to analyze cumulative impacts due to proposed construction activities is based on the RLE *Cumulative Impacts Technical Memorandum*. In general, the API for cumulative impacts includes broader geographic areas than those for direct impacts. The API for cumulative impacts reflects the distribution of the individual resources and is not limited to the project area; it consists instead of the boundaries specific to the resources, such as the construction limits for a transportation improvement, private development, or another public infrastructure project that is near enough to the project and being performed at the same time, potentially inducing cumulative impacts.

3.6 Methods

The analysis is based on considerations including potential construction methods, staging, and possible impacts on environmental resources. The impacts were identified during the analysis performed for each of the NEPA resources. Construction impacts are temporary in nature and are not relevant to the operation of transit services once the proposed project has been constructed. Impacts associated with post-construction activities were therefore not included in this analysis.

Section 4
Affected Environment

The affected environment for construction impacts depends on the geographic frame of reference used to analyze existing conditions for each of the environmental resources listed in Section 3. Analysis of the resources used the geographic frames of reference most relevant to each field of study: the API, community areas, or designated track segments.

4.1 Analyzed by Area of Potential Impact

Resource analyses that considered general environmental conditions or the built environment at a macro level were described by API. Section 6 provides additional information regarding APIs for each environmental resource. The resources framed by API include the following:

- Parklands and Community Facilities
- Noise and Vibration
- Safety and Security
- Hazardous Materials
- Air Quality
- Water Resources
- Energy
- Environmental Justice
- Transportation

4.2 Analyzed by Community Areas

The project area encompasses parts of nine community areas in the City of Chicago and the eastern section of the Village of Calumet Park. Chicago community areas include Beverly, Washington Heights, Roseland, Morgan Park, Pullman, West Pullman, Riverdale, Hegewisch, and South Deering. The project area comprises residential (primarily single-family), industrial (both existing and vacant), transportation (including freight), and commercial development. The API for direct impacts due to RLE Project construction activities varies depending upon the API for each of the resources analyzed. Community areas were used for these resources based on the public's understanding of cultural context and community boundaries. These resources include the following:

- Land Use and Economic Development
- Displacements and Relocation of Existing Uses
- Neighborhood and Community Impacts
- Historic and Cultural Resources

4.3 Analyzed by Segments of Track

The API for some resources was subdivided into several track segments as shown in Figure 4-1 at the end of this section. Analysis by track segment frames the impact on resources that may be more susceptible to construction impacts, and accounts for a variety of construction techniques

that may apply only to specific segments of track. Resources described by track segment include the following:

- Visual and Aesthetic Conditions
- Vegetation and Wildlife Habitat

Track segments provide a framework for proposed sequencing and coordination with CTA operations and overall construction activities. The segments were also developed so that construction activity in a particular segment could function as a separate contract.

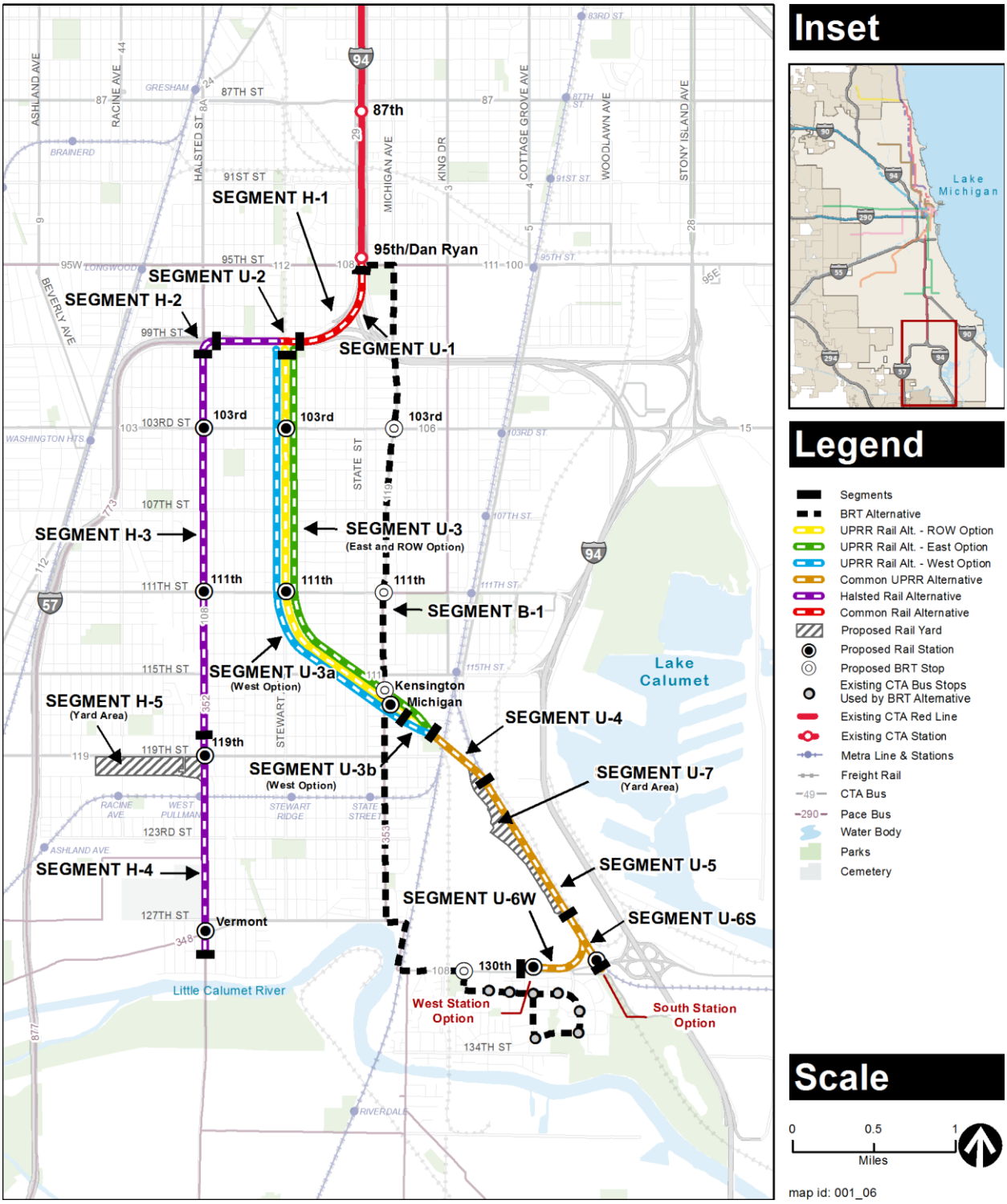

Figure 4-1: Red Line Extension Alternatives - Construction Segment Map

Section 5
Description of Construction

This section is based on and references the *Description of Construction and Phasing for Environmental Impact Statement Build Alternatives*. A summary of the report is provided below. For specific details regarding construction sequencing and phasing, please refer to Section 3 of the *Description of Construction and Phasing for Environmental Impact Statement Build Alternatives*. The report details the construction activities for the BRT Alternative, UPRR Rail Alternative, and Halsted Rail Alternative (the build alternatives).

The following are the major constructability, construction sequencing, and phasing assumptions. Phasing and construction segments may change due to refined engineering, available funding, and other factors later in the project implementation stage. Construction activities involving caisson construction, train rerouting, CTA/UPRR track shutdowns, trackwork, elevated structures, structural steel erection, and pile placement would only be associated with the rail alternatives.

5.1 Constructability Assumptions for the Bus Rapid Transit Alternative

The coordinated construction of infrastructure and stops is a key component of planning and design. Assumptions that affect design solutions include the following:

- The location of stops and parking facilities.
- The ability to perform construction so as to facilitate CTA operations, specifically near the 95th Street Terminal, UPRR operations, and adjacent vehicle traffic.

The following parameters have been assumed for the BRT Alternative:

- The methods of construction required along the proposed alignments would be conventional, using standard construction methods and materials including cast-in-place concrete and pre-cast concrete.
- Streets with adjacent alleys would be used for site access during construction.
- Space for storage and staging of construction materials, equipment, and temporary facilities would occur within the immediate construction zone or work area. Construction material storage and contractor yard areas would also be available at the proposed parking areas.
- Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval.
- Streets, along with adjacent alleys, would be closed temporarily or the number of travel lanes may be reduced for truck queuing and other construction activities.

5.2 Constructability Assumptions for all Rail Alternatives

The coordinated construction of infrastructure and stations is a key component of planning and design. Assumptions that affect design solutions include the following:

- The location of stations, parking facilities, and yard locations.
- The type of aerial structure. New construction of aerial structures would include foundation, columns, and decking. New construction of retained embankment structures would include foundation and two parallel reinforced concrete retaining walls with fill in between.
- The ability to construct facilities in phases to facilitate CTA operations, specifically near the 95th Street Terminal, the 95th Street substation, and 98th Street Yard and Shop.
- The ability to construct facilities in sequences and phases to facilitate UPRR operations.
- The location and size of proposed foundations and structural members that are potentially limited by clearance requirements (e.g., caisson size and depth, concrete pour access, piece weight and size, and similar).
- The ability to phase construction of structures to facilitate traffic operations on I-94 and 1-57.

The following parameters have been assumed for all rail build alternatives:

- The methods of construction required along the proposed alignments would be conventional, using standard construction methods and materials including cast-in-place concrete, pre-cast concrete, and structural steel.
- Streets with adjacent alleys would be used for site access during construction. New construction in and adjacent to the 95th Street Terminal would require track shutdowns in order to access the work site. To perform this work in an efficient manner, while maintaining reasonable service and access to the 98th Street Yard and Shop, it is anticipated that construction would be sequenced and phased to maintain some level of access to the 98th Street Yard and Shop.
- Space for storage and staging of construction materials, equipment, and temporary facilities would occur within the ROW. Construction material storage and contractor yard areas would be available at the proposed parking areas and/or maintenance yard. Construction access adjacent to the ROW could be required, especially during viaduct and station construction activities.
- During construction, access to work zones adjacent to the expressway would require shoulder and lane closures. For the superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would only occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Construction adjacent to or over railroads would require flagging operations and scheduled track closures.

- It is anticipated that streets crossed for station and viaduct construction would be closed temporarily and/or the number of travel lanes would only be reduced during heavy construction activities.

5.3 Construction Phasing and Segments

Phasing construction and performing construction in segments would allow CTA to limit the duration of impacts in a given area rather than potentially affecting resources and areas along the entire corridor simultaneously. Every attempt would be made to group as many construction activities as possible in a given area in order to maximize efficiency and limit the duration of the impact. Phasing and segmenting construction activities also allows for more focused analysis of potential impacts along a corridor that may have several different concentrations of resources and land uses. Construction activities would be grouped by type of work and location. The overall schedule and coordination of all construction segments would be phased and scheduled to maintain CTA operations at the 95th Street Terminal, the 95th Street substation, and 98th Street Yard and Shop, and vehicular traffic on affected expressways and roadways. Figure 4-1 shows the alignments of all alternatives and the construction segments where applicable.

5.3.1 Bus Rapid Transit Alternative

The corridor for the BRT Alternative consists of one segment for the purposes of describing construction activities. Work activities would include new construction of the following:

- BRT shelters and amenities at BRT stops and park & ride facilities.
- Pavement markings, crosswalks, and signage.
- Americans with Disabilities Act-compliant ramps, bus pads, and lighting at BRT stops.
- A traffic signal at the 130th Street/Eberhart Avenue intersection.
- Transit signal priority detectors and the improvement of traffic signal controllers at existing signalized intersections.

Construction activities would also include utility relocation, sidewalk improvements, and the removal of on-street parking spaces at the proposed BRT stop locations.

All of the construction work activities may require temporary shutdown of traffic, and possible CTA and Pace bus rerouting, which would occur during non-peak and during low-traffic-volume intervals per IDOT and CDOT approval. Work zones along the BRT Alternative would likely require temporary lane closures. Work would be sequenced to minimize impacts and access to adjacent roadways and both commercial and residential buildings.

Additional buses associated with the BRT Alternative would be stored and maintained at other CTA bus garages, such as the 103rd Street Garage.

5.3.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

The UPRR Rail Alternative corridor is divided into seven segments for the purposes of describing construction activities.

A proposed 270-car yard and shop facility, to be located at 120th Street and Cottage Grove, is included as part of all three UPRR Rail Alternative options. The facility would be located on a combination of industrial and vacant land east of the CN/ME tracks and west of the Northern Indiana Commuter Transportation District/Chicago South Shore & South Bend Railroad (NICTD/CSS & SBRR) tracks. The yard would be entirely at grade. A nominal amount of parking for employees would be included. A proposed substation within the 120th Street yard and shop west of the existing railroad tracks and east of the proposed facility may be included as part of the facility.

5.3.2.1 UPRR-ROW Segment U-1

Work activities in UPRR ROW Option Segment U-1 would include the following:

- New trackwork and signals to tie into the 95th Street Terminal.
- New construction of a retained fill structure south of the 95th Street Terminal.
- New construction of single-track, elevated structures over existing CTA tracks leading to the 98th Street Yard and Shop and over the existing CTA/southbound I-94 tunnel.
- New construction of dual-track, elevated structure through the I-94/I-57 interchange, across the westbound (WB) I-57 entrance ramp from northbound (NB) I-94, and along the I-57 corridor.
- Proposed structure construction would be sequenced to minimally affect traffic flow on the WB I-57 entrance ramp from NB I-94. For superstructure erection over the expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval.

It may be necessary to relocate trackwork leading from the 95th Street Terminal to the existing 98th Street Yard and Shop to allow construction of proposed substructure within the CTA ROW. Tying proposed trackwork and structure into existing trackwork at the 95th Street Terminal would be sequenced to provide rail car access to the 98th Street Yard and Shop. Proposed structure construction would be sequenced to maintain operating routes from the 95th Street Terminal to the 98th Street Yard and Shop, as well as maintain traffic flow on I-94 through the tunnel.

Superstructure erection over the CTA tracks, I-94, the WB I-57 entrance ramp from NB I-94, and Wentworth Avenue would require temporary shutdown of expressway traffic and CTA non-revenue operations to the yard. Temporary shutdown of traffic would occur during non-peak and low-traffic-volume intervals per IDOT and CDOT approval. CTA non-revenue operations

would be shut down during off-peak hours or weekends. Work would be sequenced to minimize impacts on traffic flow on the I-57/I-94 interchange, as well as in the I-57 corridor. Work zones adjacent to the expressway would require shoulder closures and possibly lane closures.

5.3.2.2 UPRR-ROW Segment U-2

Work activities in UPRR ROW Option Segment U-2 would include new construction of dual-track, elevated structure consisting of multiple types of superstructure and substructure spanning I-57 and within the UPRR corridor.

Work would be sequenced to minimize impacts on traffic flow on I-57. Work zones adjacent to the expressway would require temporary shoulder and lane closures. Superstructure erection over I-57 would require temporary shutdown of NB traffic.

5.3.2.3 UPRR-ROW Segment U-3

Work activities in UPRR ROW Option Segment U-3 would include the following:

- New construction of an elevated structure within the UPRR corridor.
- Construction of new stations at 103rd Street, 111th Street, and Michigan Avenue.
- Construction of two new substations.
- Construction of surface parking lots and bus turnarounds at the proposed 103rd and 111th Street stations.
- Construction of a parking garage and bus turnaround at the proposed Michigan Avenue station.

All existing structures and underground utilities would be identified. All existing utilities would be protected or relocated.

5.3.2.4 UPRR-ROW Segment U-4

Work activities in UPRR ROW Option Segment U-4 would include the following:

- New construction of dual track and an elevated structure within the UPRR corridor, branching off and running along the east side of the corridor over the CN/ME tracks.
- New construction of an elevated structure to the 120th Street yard and shop tie-in.
- New construction of a retained embankment structure to carry the elevated structure to grade.

Construction at the CN/ME crossing would be phased to minimize impacts on CN and Metra operations. Construction over and adjacent to the railroads would require flagging operations and potential limited track closures.

5.3.2.5 UPRR-ROW Segment U-5

Work activities in UPRR ROW Option Segment U-5 would include the new construction of track roadbed at grade and the construction of the MWRD access road and bridge over the proposed CTA tracks and the NICTD/CSS & SBRR crossing.

5.3.2.6 UPRR-ROW Segment U-6S

There are two station options for the 130th Street Station: a South Station Option (U-6S) and a West Station Option (U-6W).

Work activities in UPRR ROW Option Segment U-6S would include the following new construction:

- Track roadbed
- The 130th Street station including parking lots and multi-story garage
- Areas for land development, bus bays, and road access for the 130th Street station
- The MWRD access road to the 130th Street station
- One new substation

Coordination with MWRD would be necessary to maintain current operations during new track roadbed construction and during the new road access for the 130th Street station. If necessary, construction would be sequenced to construct the MWRD access road to the west of the station first, allowing MWRD facilities to continue operation. Coordination with the NICTD/CSS & SBRR would be necessary because construction over and adjacent to the railroads would require flagging operations and scheduled track closures.

5.3.2.7 UPRR ROW Segment U-6W

Work activities in UPRR ROW Option Segment U-6W would be similar to those in U-6S with the addition of crosswalks, a signalized intersection at 130th Street and Evans Avenue, and a bridge, in addition to a road at 130th Street.

Coordination with MWRD would be necessary to maintain operations during construction of the new access road for the 130th Street station. If necessary, construction would be sequenced to construct the proposed MWRD access road and bridge crossing the proposed CTA tracks first, thus allowing MWRD facilities to continue operation. Coordination with the NICTD/CSS & SBRR would be necessary because construction over and adjacent to the railroads would require flagging operations and scheduled track closures.

5.3.2.8 UPRR ROW Segment U-7

Construction for the 120th Street yard and shop would be scheduled and coordinated to maintain operations at the MWRD facilities. Work would be sequenced to minimize impacts on adjacent

roadways and both commercial and residential buildings. Construction activities associated with the 120th Street yard and shop would include the following:

- New construction of dual track and elevated structure, new yard and track, shop building, shop access road, and parking.
- Potential construction of a new substation.

5.3.3 Union Pacific Railroad Rail Alternative - East Option

The corridor is divided into seven segments for the purposes of describing construction activities.

5.3.3.1 UPRR East Option Segments U-1 and U-2

Construction and phasing activities would be the same as for the UPRR ROW Option.

Work activities would be sequenced to minimize impacts on traffic flow on I-57 and UPRR operations. Work zones adjacent to the expressway would require temporary shoulder and lane closures. Superstructure erection over I-57 would require temporary shutdown of NB traffic. Construction adjacent to railroads would require flagging operations and scheduled track closures.

5.3.3.2 UPRR East Option Segment U-3

Work activities in UPRR East Option Segment U-3 would include the following:

- Demolition of existing buildings and structures in the proposed ROW where necessary.
- New construction of dual-track, elevated structure consisting of multiple types of superstructure and substructure along the east side of the UPRR corridor.
- New construction of stations at 103rd Street, 111th Street, and Michigan Avenue.
- New construction of surface parking lots and a bus turnaround at 103rd Street station and 111th Street station and new construction of a parking garage and bus turnaround at the Michigan Avenue Station.
- Construction of two new substations.

Work would be sequenced along the UPRR corridor to minimize impacts on UPRR operations. Construction adjacent to railroads would require flagging operations and scheduled track closures. Possible signaling would be needed to replace existing signaling during construction of viaducts for the following at-grade UPRR crossings: 101st Street, 103rd Street, 107th Street, 109th Street, 111th Street, Michigan Avenue, and State Street. All existing structures and underground utilities would be identified, protected, or relocated as described for UPRR ROW Segment U-3.

5.3.3.3 UPRR East Option Segment U-4

Work activities in UPRR East Option Segment U-4 would include the following:

- Demolition of existing building and structures in the proposed ROW where necessary.
- New construction of dual-track, elevated structure along the east side of the UPRR corridor and over the CN/ME tracks.
- New construction of UPRR yard and shop track tie-in.

5.3.3.4 UPRR East Option Segments U-5, U-6S, U-6W, and U-7

The phasing activities would be the same as those described for the UPRR ROW Segments U-5, U-6S, U-6W, and U-7.

5.3.4 Union Pacific Railroad Rail Alternative - West Option

The corridor is divided into seven segments for the purposes of describing construction activities.

5.3.4.1 UPRR West Option Segments U-1 and U-2

Construction and phasing activities for the UPRR West Option would be the same as for the UPRR ROW Option.

Work activities in zones adjacent to the expressway and Eggleston Avenue may require temporary shoulder and lane closures. Superstructure erection over I-57 and the UPRR corridor would require temporary shutdown of NB traffic and UPRR operations. Construction adjacent and across railroads would require flagging operations and scheduled track closures.

5.3.4.2 UPRR West Option Segment U-3a

This portion of the alignment would extend from the end of the horizontal curve at the UPRR crossing to the Prairie Street crossing. Work activities in UPRR West Option Segment U-3a would include the following:

- Demolition of existing buildings and structures in the proposed ROW.
- New construction of dual track and elevated structure along the west side of the UPRR corridor.
- New construction of stations at 103rd Street, 111th Street, and Michigan Avenue.
- New construction of surface parking lots and bus turnarounds at the 103rd Street station and the 111th Street station and new construction of a parking garage and bus turnaround at the Michigan Avenue station.

Work would be sequenced along the UPRR corridor to minimize impacts on UPRR operations. Construction adjacent to railroads would require flagging operations and scheduled track closures. Signaling may be needed to replace existing signaling during construction of viaducts for

the following at-grade UPRR crossings: 101st Street, 103rd Street, 107th Street, 109th Street, 111th Street, Michigan Avenue, and State Street.

5.3.4.3 UPRR West Option Segment U-3b

This portion of the alignment would extend from the Prairie Street crossing to the CN/ME crossing. Work activities in UPRR West Option Segment U-3b would include the following:

- New construction of dual-track, elevated structure along the east and west side of the UPRR corridor, as well as across the UPRR tracks, would consist of multiple types of super- and substructure spanning along and across the UPRR corridor and Prairie Avenue.

Work would be sequenced along and across the UPRR corridor to minimize impacts on UPRR operations. Construction adjacent to railroads would require flagging operations and scheduled track closures. Work zones adjacent to Prairie Avenue may require lane closures and may cause temporary shutdown of all traffic.

5.3.4.4 UPRR West Option Segment U-4

Work in UPRR West Option Segment U-4 would include the following:

- Demolition of existing buildings and structures in the proposed ROW as necessary.
- New construction of dual-track, elevated structure along the east side of the UPRR corridor and over the CN/ME tracks.
- New construction of the 120th Street yard and shop track tie-in.
- New construction of retained embankment structure to carry elevated structure to grade.

5.3.4.5 UPRR West Option Segment U-5

Construction and phasing activities in U-5 would be the same as those described for UPRR ROW Segment U-5.

5.3.4.6 UPRR West Option Segments U-6S, U-6W, and U-7

Construction and phasing activities in U-6S, U-6W, and U-7 would be the same as those described for the UPRR ROW Option.

5.3.5 Halsted Rail Alternative

The corridor is divided into five segments for the purposes of describing construction activities.

The proposed 119th Street yard and shop would be located south of the 119th Street station and north of the Vermont Avenue station west of Halsted Street. The parcel on which the yard would be constructed is west of the 119th Street park & ride location. Track height would transition from elevated at station height to at grade between Halsted Street and Morgan Street, through the park & ride facility. The yard would be entirely at grade. A nominal amount of parking for employees would be included at the yard.

5.3.5.1 Halsted Segment H-1

Work activities in H-1 would include the following:

- New trackwork and signals to tie into the 95th Street Terminal.
- New construction of retained fill structure south of the 95th Street Terminal.
- New construction of single-track, elevated structures over the existing CTA tracks leading to the 98th Street Yard and Shop and over the existing CTA/southbound I-94 tunnel.
- New construction of dual-track, elevated structure through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and along the I-57 corridor.
- Proposed structure construction would be sequenced to minimally affect traffic flow on the WB I-57 entrance ramp from NB I-94. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and low-traffic-volume intervals per IDOT and CDOT approval.

The phasing activities would be the same as for UPRR Rail Segment U-1.

5.3.5.2 Halsted Segment H-2

Work activities in H-2 would include new construction of dual track and elevated structures consisting of multiple types of super- and substructure spanning along and across I-57 and across Halsted Street. Work zones adjacent to and across the expressway may require shoulder and lane closures. Superstructure erection would require temporary shutdown of NB traffic on I-57 and at the intersection of 99th Street and Halsted Street.

5.3.5.3 Halsted Segment H-3

Work activities in H-3 would include the following new construction:

- Dual track and an elevated structure consisting of multiple types of super- and substructure spanning along Halsted Street
- Stations at 103rd Street and 111th Street
- A surface parking lot and bus turnaround at the 103rd Street station
- A surface parking lot at the 111th Street station
- Two new substations

Work would be phased to minimize traffic impacts on Halsted Street and adjoining streets. The construction of the elevated structure would require lane and street closures. In order to increase roadway capacity, parking along Halsted Street would potentially be eliminated during construction. Superstructure erection would require temporary shutdown of all traffic along segments of Halsted Street during off-peak or weekend hours. Traffic would be detoured to the

next major north/south roadway to minimize traffic impacts. Detour routes for Halsted Street would be identified in a Maintenance of Traffic Plan as part of final engineering.

5.3.5.4 Halsted Segment H-4

Work activities in H-4 would include the following new construction:

- Dual track and an elevated structure consisting of multiple types of super- and substructure spanning along Halsted Street
- Stations at 119th Street and Vermont Avenue
- A surface parking lot and bus turnaround at the 119th Street station
- Both a surface parking lot and a parking garage, as well as bus bays, at the Vermont Avenue station
- Two new substations
- Three tracks and an elevated structure south of the Vermont Avenue station
- A surface parking lot at the 111th Street station

The phasing activities for Halsted Segment H-4 would be the same as for Segment H-3.

5.3.5.5 Halsted Segment H-5

For analysis of construction, the 119th Street yard and shop has been separated from the Halsted Rail segments. Work would be sequenced to minimize impacts on adjacent roadways and buildings. Work activities for the 119th Street yard and shop would include the demolition of existing buildings and structures in the proposed ROW where necessary and construction of a new yard, track shop building, shop road access, and parking.

5.4 Potential Construction Staging Areas

Construction staging would be within the proposed ROW or within construction easements of stations/stops and alternative alignments. The following provides a general description of the types of properties that may be used for construction staging in order to minimize impacts:

- Parcels to be acquired by CTA for the implementation of a given alternative would be used as staging areas. Whole parcels or groups of parcels may be acquired and used for the RLE Project. After construction, residual property may be sold.
- Nearby parking lots may be used through the establishment of temporary construction easements.
- Abandoned adjacent parcels may be used through the establishment of temporary construction easements.

In the event of limited available space adjacent to the construction site, off-site CTA, municipal, or privately owned storage yards may need to be provided for the contractor's use. This would allow secure storage of an equipment fleet or permanent materials needing large storage or assembly areas.

5.5 Anticipated Construction Activities and Methods

5.5.1 Basic Construction Activities and Methods

A summary of potential construction activities and methods for the build alternatives is presented in the Construction Matrix within Appendix A. The intent of the Construction Matrix is to provide a general level of construction activity that may occur with each alternative. The Construction Matrix identifies a range of activities based on currently available information and is not intended to be used for scheduling construction, nor is it intended to be used for estimating construction cost.

Terms used to describe quantities of construction materials and durations of construction activities are based on the *Description of Construction and Phasing for Environmental Impact Statement Build Alternatives*. Some, but not all, of these terms are defined below.

- Duration (Months) - Estimated number of months a work activity would be required. Activities would not be sequential, except for advance work if required in the segment. Construction phasing and the need to maintain transit operations would affect the duration of construction activities.

- Construction Equipment - Possible types of construction equipment that may be used for a particular duration within an activity.

- Soil (cubic yards) - Potential amount of cubic yards of earthwork that may be excavated or removed. Concrete removed is included in the soil quantity. Soil removed to install structural caissons and foundations is included in this category.

- Concrete (cubic yards) - Represents the potential quantity of concrete to be placed, including that for caissons and concrete repair areas. Concrete at stations/stops includes concrete used for buildings and platforms. Concrete for track support is included under column concrete in the Elevated Structure activity.

- Structural Steel (pounds) - Represents the potential quantity of new structural steel weighed in pounds. Structural steel at stations includes steel used for buildings and platforms. Structural steel for track support is included in the Elevated Steel Structure activity.

- Average Truck Trips Per Workday - Estimation of the average number of truck trips per workday for an activity. The activity does not include smaller vehicles used for administrative and management purposes or vehicles used by workers to commute to and from the work site.

- Average Workers Per Workday - Estimation of the average number of workers for an activity per workday.

5.5.2 Preconstruction Activities

Contractor preconstruction activities would include development of construction schedules, quality plan, procurement schedules, and would include the following activities as well:

- Process plans would be developed for coordination of work activities to match construction constraints and site access.
- Existing conditions would be verified for design and construction interface criteria. Survey controls would be established for verification of site, existing conditions, and utility conflict/relocation information.
- Utility protection/relocation information would be coordinated and verified in sequence of scheduled construction far in advance of the early construction activities.
- Community notifications would be initiated by the CTA and the Contractor, as early as possible.
- Demolition and building permits would be obtained at the earliest opportunity. City of Chicago Office of Underground Coordination requirements (e.g., shoring designs, support of excavation, caisson procedures) would be met and approved for permits.
- Any special trackwork/signal work/interlocking requirements would be coordinated or procured by the CTA in advance of project procurement and in sequence with any schedule requirements.
- Compliance with all CTA Quality Control and the International Organization for Standardization (ISO) requirements.

5.5.3 Traffic Rerouting

During construction, vehicles, pedestrians, buses, and trains may need to be rerouted around the construction sites. Rerouting of traffic may be done using detours and/or complete street closures. The street closures could include main streets and side streets, as well as alleys and access points. Station and viaduct construction activities, for the rail construction, would be sequenced around street and alley closures. Temporary traffic lanes, temporary access points, or staged construction would be used. The following activities would be part of the traffic rerouting activities:

- Construction signage and temporary traffic barriers, accessibility adjustment (temporary curb ramps).
- Temporary reductions in number of thru-traffic lanes in each direction from two to one, if feasible.
- Detours/complete street closures, including alleys and access points.
- Temporary traffic lanes.

- Construction vehicle access points within and/or adjacent to the ROW.
- Business, residential, and pedestrian impacts including limited parking or parking bans.
- Advance trackwork and signalization to facilitate train rerouting.
- Alternate bus routes and temporary CTA outages may be required during construction of the RLE Project at the 95th Street Terminal.
    - CTA track shutdowns during nights or weekends may be required.
    - Trains would operate on one or two tracks through the construction zones. Flagmen would be required to notify trains of construction activities.

5.5.4 Demolition

Demolition of existing buildings and structures in the proposed ROW would be required. The demolition process would result in increased noise, debris, roadway closures, and construction vehicle access. Work would be performed within parameters of local ordinances for construction activities. In general, pedestrian and vehicular traffic would not be allowed into the area of demolition.

The demolition process would include concrete removal, which would require construction workers to saw cut, jackhammer, knock out the existing concrete, cut or remove the existing reinforcement, or complete demolition of the concrete structures.

To remove foundations or streets, or to relocate existing utilities, the contractor would have to excavate with bulldozers, bobcats, or backhoes to dig and remove the earth. The material to be disposed would be placed in dump trucks and hauled offsite.

Construction vehicles would be accessing the construction site on a regular basis and would require special hauling routes to remove the debris and deliver materials and equipment to the site. The routes may require temporary shutdown of streets, complete closures, or rerouting of traffic. There is ample street capacity and land available for construction staging in the project area. While specific construction routes have not been finalized for the project, it is anticipated that impacts would either be avoided or readily mitigated. This conclusion will be confirmed after designation of a NEPA Preferred Alternative and completion of a detailed construction management plan including routing. Depending on the type of material that would be removed, special handling of waste may be necessary.

5.5.5 Temporary Shoring

During demolition and excavation, temporary shoring may be required to protect adjacent property and/or tracks. The shoring would consist of steel sheet piling that would be driven into the ground with a vibratory pile driver. The rig may be placed within the construction zone or outside the ROW, depending on space limitations and access points. The temporary shoring may

require the use of tiebacks, which are long rods that would be drilled through the sheet piling, embedded into sound rock or other approved materials, and then grouted into place.

5.5.6 Foundations

Due to the variety of structures, including CTA elevated structure, stations/stops, and parking garages, there would be a variety of foundations on the RLE Project. Foundations could consist of concrete spread footings, steel pile foundations, or concrete caisson foundations with caisson caps to transition to exposed columns. The type of foundation depends on the site conditions and structure type.

All types of spread or shallow type foundations would require excavation and removal of earth to form the concrete footings. Bulldozers, bobcats, or backhoes would be used to dig and remove the earth. The earth may be placed in dump trucks and hauled off site or stored for use on the construction site for backfill.

Large cranes with pile-driving leads that help guide the piles into position would be used for the installation of a pile foundation. A diesel hammer would drive the piles into the ground by impact. Pile shoes or pile tips added to the end of a pile or a pre-drilled hole supported by a steel casing could be used to aid the pile installation process.

Caisson construction would also be performed with a crane-mounted drilling rig. An auger of the design diameter would be drilled into the ground and the spoils would be piled nearby for removal. As the auger advances, extensions are added to the supporting shaft. Often, the drilled hole is fitted with a lining when unstable soils are encountered. A pre-formed reinforcement cage would be installed and concrete would be placed to form the caisson support.

5.5.7 Concrete Placement

Determination of the concrete plant location, based on availability of the required concrete mix, is an important part of the construction logistics and process plan. The plant would supply and deliver the concrete to the site using concrete trucks. Temporary street closures and truck routes may need to be established to access the construction site. Coordination of multiple trucks may be necessary for large pours and may require special access and scheduling. The contractor may elect to create an on-site ready-mix plant to supply the concrete if there is ample on-site space and the nearest concrete plant is far away.

Before the concrete could be poured, all necessary reinforcement and concrete forms would need to be in place. The reinforcement would be delivered on large flatbed trucks and would be stored on site in bundles. The formwork could consist of large steel panels or plywood that holds the wet concrete in place. The formwork would be braced or temporarily supported to maintain the weight of the concrete until it cured.

The truck would then be positioned at the location required for the pour. If the truck could not access the location of the pour, the concrete would need to be placed by pump, conveyer system, or similar measures. It may need curing for a week before forms could be removed.

5.5.8 Structural Steel Erection

The proposed improvements would require standard steel erection to assemble the structures. Structural steel could consist of plates, angles, girders, beams, cross frames, deck plates, rails, or similar. The steel could vary in size, length, weight, and use.

The steel members would be delivered to the site on large flatbed trucks or semi-trucks and could require special hauling permits. The construction zone would require special access areas so that the steel could be delivered, assembled on site, stored, or moved into position. Cranes would be used to pick the pieces off the trucks, move the material overhead and place them into position.

5.5.9 Methods for Protecting Utilities and Adjacent Structures

Methods for protecting nearby utilities and adjacent structures would include standard industry practice techniques. These techniques include coordinating with existing utilities and field verifying locations. The Office of Underground Coordination requires a review of foundations that are within two feet of the property line. Dig requests must be submitted to Chicago DIGGER (Chicago Utility Alert Network) for areas within the limits of the City of Chicago and Joint Utility Locating Information for Excavators (JULIE) for areas outside the City of Chicago limits before any excavation can begin.

Section 6
Impacts and Mitigations

This section summarizes the potential construction impacts for each of the build alternatives, as well as the general mitigation measures. All RLE alternatives are analyzed in this memorandum; however, the No Build Alternative does not involve any construction activities, therefore, no construction impacts would occur, and no further discussion of the No Build Alternative is included here.

6.1 Land Use and Economic Development

The following is a summary of construction impacts described in the *Land Use and Economic Development Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API for the land use and economic development evaluation includes parcels directly adjacent to project alternative centerlines and the area within a ½-mile radius of stations.

6.1.1 Bus Rapid Transit Alternative

There would be isolated disruptions to business and residential access during construction at parcels directly adjacent to the proposed bus stops and park & ride lots. Due to the isolated site improvements and short construction timeframe, the construction impacts of the BRT Alternative would be considered not substantially adverse on existing land uses. Due to construction jobs creation (refer to the *Land Use and Economic Development Technical Memorandum* for an estimate of the number of short-term jobs), the construction impacts of the BRT Alternative would be considered beneficial for economic development.

6.1.2 Union Pacific Railroad Rail Alternative

The potential construction impacts and mitigation would be similar for the UPRR Rail Alternative options. For the 120th Street yard and shop, the CTA would coordinate construction activities with the MWRD to avoid conflicts with utility operations.

Construction would take up to 5 years and would cause temporary impacts on adjacent residential neighborhoods due to noise, fugitive dust, truck traffic, and roadway detours. Mitigation methods would include daytime construction and soundproofing for sensitive resources, if necessary. Based on mitigation and the beneficial impacts of the project, the land use impacts from construction would be considered not substantially adverse.

Construction would cause temporary impacts on adjacent commercial uses on Michigan Avenue due to noise, fugitive dust, truck traffic, and roadway detours. Mitigation would include daytime construction, commercial signage during detours, and special advertising for businesses within the ½-mile API. There would be short-term beneficial impacts from construction jobs. It is estimated that during mobilization and peak construction, up to 2,660 full-time staff (per the *Land Use and Economic Development Technical Memorandum*) would be devoted to construction of the UPRR Rail Alternative. Based on mitigation and the beneficial impacts of the project, the

overall economic development impact from construction of the UPRR Rail Alternative would be considered beneficial.

6.1.3 Halsted Rail Alternative

Construction would take up to 5 years and would cause temporary impacts on residential areas on or adjacent to Halsted Street due to noise, fugitive dust, truck traffic, and roadway detours. Mitigation methods would include daytime construction and soundproofing for sensitive resources, if necessary. Based on mitigation and the beneficial impacts of the project, the land use impacts from construction would be considered not substantially adverse.

Construction would cause temporary impacts on commercial uses along Halsted Street due to noise, fugitive dust, truck traffic, and roadway detours. Construction activities would occur throughout the Halsted Street corridor within the median and adjacent travel lane, and would affect travel lane patterns and on-street parking. Due to the nature and size of the businesses along Halsted Street, some small businesses may not be able to maintain their customer base and may lose business from construction-related disruptions. Mitigation methods would include daytime construction, commercial signage during detours, and special advertising for businesses within the ½-mile API. As it would be for the UPRR Rail Alternative, it is estimated that up to 2,660 full-time staff (per the *Land Use and Economic Development Technical Memorandum*) would be devoted to construction of the Halsted Rail Alternative. Based on mitigation and the beneficial impacts of the project, the overall economic development impact from construction of the Halsted Rail Alternative would be considered beneficial.

6.2 Displacements and Relocation of Existing Uses

There would be no displacement or relocation impacts associated with the construction phase for the build alternatives. Each of the proposed alternatives requiring permanent ROW would result in land acquisitions and displacements. The BRT Alternative would affect 52 parcels and 3 buildings. The UPRR Rail Alternative ROW Option would affect 133 parcels and 24 buildings. The UPRR Rail Alternative East Option would affect 256 parcels and 112 buildings. The UPRR Rail Alternative West Option would affect 193 parcels and 53 buildings. The Halsted Rail Alternative would affect 108 parcels and 38 buildings. Please refer to the *Displacements and Relocation of Existing Uses Technical Memorandum* for additional information on displacements and relocations. Temporary construction easements would not result in displacements or relocations.

6.3 Neighborhoods and Community Impacts

The following is a summary of construction impacts described in the *Neighborhood and Community Impacts Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API includes the neighborhood and community areas within approximately ½ mile of the proposed build alternative alignments. Accordingly, the affected environment includes the Village of Calumet Park and the Chicago neighborhoods of Washington Heights, Roseland, Morgan Park, West Pullman, Pullman, and Riverdale.

6.3.1 Bus Rapid Transit Alternative

Construction of the BRT Alternative would involve placement of new bus shelters, lighting, park & ride facilities, crosswalks, sidewalk improvements, ramps, traffic signals, and transit signal priority infrastructure along the proposed route. Work would occur largely within the street; however, some off-street staging on adjacent publicly owned and vacant lots may occur through the establishment of temporary construction easements. Some temporary road closures would be needed, and would be scheduled at night and other low-traffic times to the extent practicable and per IDOT and/or CDOT approval.

The parking structure at the Kensington Avenue stop would require more intensive construction, but would be phased to minimize disruption. Temporary dust, noise, and visual impacts would occur, as well as minor intermittent traffic delays near the construction site. Adjacent residents would experience these temporary impacts during construction, but impacts on the West Pullman community would be mitigated through best management practices.

6.3.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

Community disruption would occur during construction for the UPRR Rail Alternative. The 120th Street yard and shop would be located far enough from established communities such that no construction impacts would occur.

Most of the construction activities and staging would occur within street ROW, properties acquired as part of the project's permanent envelope, and potentially other nearby vacant parcels through the establishment of temporary construction easements. Increased truck traffic to and from the alignment would also occur. Hoisting equipment may be visible above the roofs of existing buildings. Storage of materials, equipment, and trucks would introduce visual impacts within communities, but these impacts would not be adverse given their temporary nature and CTA's use of best management practices. CTA would notify the community in advance of disruptive activities such as building demolition, utility relocation, and necessary detours, and would perform work in a manner consistent with local ordinances. Hauling routes would be designed to minimize truck traffic and equipment passing through sensitive areas of the community, and would favor highways to the extent feasible. There is ample street capacity and land available for construction staging in the project area. While specific construction routes have not been finalized for the project, it is anticipated that impacts would either be avoided or readily mitigated. This conclusion will be confirmed after designation of a NEPA Preferred Alternative and completion of a detailed construction management plan including routing.

Temporary dust, noise, and visual impacts would occur. Residents would experience these impacts during construction on an intermittent basis, but impacts on the Washington Heights, Roseland, and West Pullman communities would not be adverse through the use of best management practices. The Michigan Avenue station would require more intensive construction activities due to the multi-level parking structure, but construction would be phased to reduce impacts. Construction activities at any one location along the alignment would not last for the entire duration of the project construction phase.

During construction of the UPRR Rail Alternative, streets crossing the proposed alignment may require temporary closure. Detours would be provided to maintain access to adjacent properties, and bus transit service would detour around closures. Temporary traffic pattern changes, such as full street closure, converting a two-way street to one-way operation, or reducing the number of available travel lanes, may also be needed. Temporary parking restrictions may also be implemented to facilitate construction activities.

Businesses around the alignment and parking structure could be affected by construction activities, construction-related traffic, and road and sidewalk closures. Temporary roadway delays due to truck traffic and construction equipment would occur. The CTA would provide adequate detours and minimize road closures to the extent practicable, but some adverse impacts on businesses may occur, as people may avoid the area altogether. These potentially adverse impacts would be mitigated through early notification of construction activities, provision of temporary alternate access routes, and advertising programs to increase the visibility of affected businesses.

Public schools, public libraries, senior living centers, hospitals, daycare centers, and other public facilities near the proposed 130th Street station (both options) would be subject to temporary adverse impacts associated with potential traffic detours; however, access would be maintained throughout the duration of the project.

6.3.3 Union Pacific Railroad Rail Alternative - East Option

With the East Option, construction impacts and mitigation for affected neighborhoods would be similar to those of the ROW Option. A greater intensity of construction activities is anticipated for the East Option than for the ROW Option, because more building demolition would be required. The East Option would require the greatest number of building acquisitions of the three UPRR Rail Alternative options.

6.3.4 Union Pacific Railroad Rail Alternative - West Option

With the West Option, construction impacts and mitigation for affected neighborhoods would be similar to those of the ROW Option. A greater intensity of construction activities is anticipated for the West Option than for the ROW Option, because more building demolition would be required. The West Option would require fewer building acquisitions overall than the East Option.

6.3.5 Halsted Rail Alternative

Community disruption would occur during construction for the Halsted Rail Alternative. Construction activities would be more disruptive than under the UPRR Rail Alternative because the Halsted Rail Alternative elevated structure would be built in the median of a major commercial street instead of on private off-street ROW.

Most of the construction activities and staging would occur within street ROW, properties acquired as part of the project's permanent envelope, and potentially other nearby vacant parcels through the establishment of temporary construction easements. Increased truck traffic to and from the alignment would also occur, particularly on Halsted Street and major east-west cross

streets. Hoisting equipment would be visible above the roofs of existing buildings and in staging areas. Storage of materials, equipment, and trucks would introduce visual impacts within communities, but these impacts would not be adverse given their temporary nature and CTA's use of best management practices. CTA would notify the community in advance of disruptive activities such as building demolition, utility relocation, pile driving, caisson driving, and necessary traffic detours, and would perform work in a manner consistent with local ordinances. Hauling routes would be designed to minimize the number of trucks and equipment passing through sensitive areas of the community, and would favor highways to the extent feasible.

Temporary dust, noise, and visual impacts would occur. Residents would experience these impacts during construction on an intermittent basis, but with the application of best management practices, impacts would not be adverse.

During construction of the Halsted Rail Alternative, Halsted Streets and its east-west cross streets would require temporary, intermittent roadway and lane closures. Detours would be provided to maintain access to adjacent properties, and bus transit service would detour around closures. Temporary traffic pattern changes may also be needed such as full street closure, converting a two-way street to one-way operation, or reducing the number of available travel lanes. Temporary parking restrictions may also be implemented to facilitate construction activities.

Businesses around the alignment and parking structure would be affected by construction activities, construction-related traffic, and road and sidewalk closures. Temporary roadway delays due to truck traffic and construction equipment would occur. The CTA would provide adequate detours and minimize road closures to the extent practicable, but some adverse impacts on businesses may occur, as people may avoid the area altogether. This potentially adverse impact would be mitigated through early notification of construction activities, provision of temporary alternate access routes, and advertising programs to increase the visibility of affected businesses.

The Vermont Avenue station would require more intensive construction activities due to the multi-level parking structure, but construction would be phased to reduce impacts. Construction activities at any one location along the alignment would not last for the entire duration of the project construction phase.

6.4 Parklands and Community Facilities

The following is a summary of construction impacts described in the *Parklands and Community Facilities Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API includes parklands within 500 feet of an alternative's ROW and within ½ mile around the proposed stations/stops, and community facilities within or adjacent to the permanent ROW of an alternative and within ½ mile around the proposed stations/stops.

6.4.1 Bus Rapid Transit Alternative

Golden Gate Park would be subject to temporary impacts during the construction of the parking garage at the 130th Street stop because of its location within 500 feet of construction activities. The temporary impacts would include noise impacts from construction equipment, air quality

impacts from fugitive dust and/or an increase in vehicle activity, and temporary reduction in access to the park due to construction detours. After mitigation, there would be no adverse impacts on Golden Gate Park from construction. Mitigation would include the following:

- Construction BMP, including but not limited to no idling of vehicles to reduce emissions, watering disturbed ground surfaces to reduce fugitive dust, and performing heavy construction activities during off-peak times.
- Coordination with the Chicago Park District in order to inform park users of construction activities and detour routes, provide alternate parking if necessary, or temporarily relocate park activities to another park if necessary.

Rose Haven Manor Senior Housing (at the 102nd Street stop), New Testament Baptist Church (at the 111th Street stop), and Aldridge Elementary School (at the 130th Street stop) are community facilities that would be subject to temporary construction impacts such as noise impacts and temporary changes to traffic flow and/or parking. Mitigation would include construction BMP, detour routes through the construction area, and alternative parking provisions. After mitigation, there would be no adverse impacts on community facilities from construction activities.

6.4.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

Construction activities would occur in the northwest corner of Wendell Smith Park. Depending on the timing and schedule, construction would interfere with organized activities that occur in Wendell Smith Park. Construction activities would generate temporary noise and air quality impacts, and interrupt access and parking around the park. Construction activities would not interfere with the use of Fernwood Parkway or Block Park; however, access to these parklands could be temporarily altered while the structure, station and parking facilities at the 103rd Street station are under construction. After mitigation, the construction impacts would be considered not adverse.

Construction activities at the Michigan Avenue station would temporarily affect New Christian Joy Missionary Baptist Church with construction noise and temporary changes in access and available parking. Mitigation would involve construction BMP and the provision of information about construction schedules and changes in parking and/or detours to the church. After mitigation, construction impacts on this church would be considered not adverse.

Construction activities at cross streets along the UPRR corridor could temporarily reduce accessibility of the roadway network and cause delays for emergency service providers. Construction activities would be coordinated with the Chicago Office of Emergency Management and Communications (OEMC). In particular, the construction plans for the 103rd Street station would be coordinated with the adjacent Chicago Fire Department - Engine Co. 93, and the construction plans for the 111th Street station would be coordinated with Roseland Community Hospital. After mitigation, the construction impacts on emergency responders would be considered not adverse.

Construction activities would temporarily affect Kensington Park, which is within 500 feet of the construction activities that would occur between Prairie Avenue and CN/ME tracks. Because of the street configuration, construction vehicles would need access to the project via the Kensington Park parking lot at 118th Street. Impacts would include temporary noise and air quality impacts and reduced parking. Construction activities for the 130th Street South Station Option would temporarily affect the park entrance of the Beaubien Woods Nature Preserve on Doty Avenue. Any temporary change in access would be mitigated through coordination with the Forest Preserve District of Cook County. After mitigation, the construction impacts would be considered not adverse.

120th Street Yard and Shop There are no parklands or community facilities near the 120th Street yard and shop location; therefore, no impacts would result from the construction activities.

6.4.3 Union Pacific Railroad Rail Alternative - East Option

The East Option would have similar construction impacts on Wendell Smith Park as the ROW Option; however, a larger geographic area would be affected. After mitigation, the construction impacts would be considered not adverse.

Construction activities for the East Option would occur in the western parcel of Block Park within the proposed permanent envelope. The western parcel would be inaccessible during construction. Construction impacts from noise, air quality, and changes in access would be temporary and would be not substantially adverse because Block Park does not serve a recreational use, construction activities would not interfere with its current use, and the park is currently subject to noise from the adjacent UPRR freight rail traffic. After mitigation, the construction impacts would be considered not adverse.

Construction of the East Option would have the same impacts and mitigation for Fernwood Parkway as those described for the ROW Option. After mitigation, the impacts on Fernwood Parkway would be considered not adverse.

Construction of the East Option would affect the same community facility and emergency service providers identified for the ROW Option; therefore, the same mitigation would be used for the impacts of the East Option. After mitigation, the impacts on community facilities and emergency service providers would be considered not adverse.

The construction impacts on parklands discussed for the ROW Option would be the same for the East Option; therefore, the same mitigation would be used. After mitigation, the construction impacts would be considered not adverse.

The construction impacts on community facilities discussed for the ROW Option would be the same for the East Option; therefore, the same mitigation would be used. After mitigation, the construction impacts would be considered not adverse.

6.4.4 Union Pacific Railroad Rail Alternative - West Option

The construction impacts of the West Option on Wendell Smith Park would be the same as those described for the ROW Option, but the amount of parkland affected by construction would be smaller. The mitigation described for the ROW Option would be the same for the West Option. After mitigation, the construction impacts would be considered not adverse.

Construction activities would occur within Fernwood Parkway; this park is narrow and the proposed permanent envelope of the West Option would pass through the center of the park. The park would not be accessible during construction. The construction impacts would be considered not substantially adverse, because the park does not offer recreational amenities or activities and is largely underutilized. After mitigation, the construction impacts would be considered not adverse.

Construction of the West Option would affect the same community facility and emergency service providers identified for the East and ROW Options; therefore, the same mitigation would be used for the impacts of the West Option. After mitigation, the impacts on community facilities and emergency service providers would be considered not adverse.

The construction impacts on parklands discussed for the ROW and East Options would be the same for the West Option; therefore, the same mitigation would be used. After mitigation, the construction impacts would be considered not adverse.

The construction impacts on community facilities discussed for the ROW and East Options would be the same for the West Option; therefore, the same mitigation would be used. After mitigation, the construction impacts would be considered not adverse.

6.4.5 Halsted Rail Alternative

There are no parklands within 500 feet of the proposed ROW for the Halsted Rail Alternative, but construction activities for the Halsted Rail Alternative would occur near Major Taylor Bike Trail. The impacts on the trail would be the temporary rerouting of pedestrian and bicycle traffic across the 119th Street and Halsted Street intersection during construction. The mitigation would include communicating access changes to trail users and the Friends of Major Taylor Bike Trail and providing alternative routes for pedestrians and bicycle to cross the streets. After mitigation, the impacts on Major Taylor Bike Trail would be considered not adverse.

Construction activities would temporarily affect vehicle and pedestrian access to community facilities on and near Halsted Street; however, clear signage, detour routes, and alternate parking would be provided as mitigation. Construction would also result in temporary noise impacts for community facilities on Halsted Street. While construction noise is unpleasant, it is temporary and would not interfere with any community facility's ability to provide service. Construction BMP would be implemented to mitigate noise impacts. Lastly, construction would generate fugitive dust and other air quality impacts from construction vehicles. Due to sensitive populations, adjacent schools and senior centers would be more sensitive to temporary air quality impacts. Construction BMP to capture dust and minimize idling construction vehicles would be

used to mitigate these impacts. After mitigation, the impacts on community facilities would be considered not adverse.

Construction activities would temporarily reduce accessibility of the roadway network, which could cause delays for emergency service providers. The same mitigation described for the UPRR Rail Alternative would be used to inform the OEMC and the Chicago Fire Department - Engine Co. 115. After mitigation, the impacts on emergency service providers would be considered not adverse.

119th Street Yard and Shop - There are no parklands within 500 feet of the proposed ROW for the 119th Street yard; however, construction of the 119th Street yard and shop would affect the Chicago Fire Department - Engine Co. 115 and Mt. Zion First Holy Miracle Church. After mitigation, the impacts on this emergency service provider and community facility would be considered not adverse.

6.5 Visual and Aesthetic Conditions

The following is a summary of construction impacts described in the *Visual and Aesthetic Conditions Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API includes all areas along the alternative corridors within visual range of pedestrians, but would depend on the existence of view corridors. View corridors, including parks and streets, can increase the API. View corridors perpendicular to the project area are assumed to be ¼ mile.

6.5.1 Bus Rapid Transit Alternative

There would be minimal construction impacts on the existing visual condition along the BRT Alternative route. The visual impacts would be temporary, lasting several weeks to a year, and would relate primarily to parking facilities. Visual impacts may include construction fencing, demolition of existing buildings or clearing of vacant lots, temporary street closures and related signage, and temporary lighting or entrances. During construction, BMP and debris-free construction areas would mitigate temporary visual impacts from the construction sites; therefore, the temporary visual impacts would be considered not adverse.

6.5.2 Union Pacific Railroad Rail Alternative

Construction impacts and mitigations would be similar in nature for all UPRR Rail Alternative options. The 120th yard and shop would be located within an industrial land use area, far enough from established communities such that no construction impacts would occur.

The construction impacts from the UPRR Rail Alternative would be more extensive on the existing visual condition than those of the BRT Alternative. The visual impacts would be temporary, lasting several months to a few years depending on the alignment location and occurrence of station facilities and parking. Visual impacts may include construction fencing, demolition of existing buildings, temporary walls, temporary street closures and related signage, temporary lighting, temporary entrances, and shoring of concrete structures or existing viaducts

during construction. During construction, BMP and debris-free construction areas would mitigate temporary visual impacts from the construction sites; therefore, the temporary visual impacts would be considered not adverse after mitigation.

6.5.3 Halsted Rail Alternative

Construction impacts and mitigations would be the same as those described for the UPRR Rail Alternative. Additional road construction impacts would be created for the removal of trees within the median planters and replacement with hammerhead piers. Temporary visual impacts would be considered not adverse after mitigation.

6.6 Noise and Vibration

The following is a summary of construction impacts described in the *Noise and Vibration Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. A general assessment was conducted to determine the location of areas that could have a moderate or severe impact along the proposed corridors. This assessment established an impact contour (defining the outer limit of an impact corridor) because there are numerous existing noise-sensitive receptors along the entire length of the project corridor.

6.6.1 Bus Rapid Transit Alternative

Construction noise from the BRT Alternative would result from minor construction activity at the bus stop areas and parking facilities. Construction noise levels are not expected to exceed the FTA construction noise limits; therefore, the impacts would be considered not adverse.

6.6.2 Union Pacific Railroad Rail Alternative

The UPRR Rail Alternative options would include the construction of an aerial structure, stations, and parking facilities. There would be the potential for construction impacts and mitigation in residential areas and the 120th Street yard and shop. Typical construction equipment could include excavators, front-end loaders, cranes, drilling rigs, compressors, and trucks depending on the type of construction work required. The FTA construction noise impact assessment is based on the cumulative noise level from the two loudest pieces of equipment that, under worst-case conditions, would operate continuously at full power over a period of 1 hour. From the list of construction equipment in the FTA guidance manual, the two noisiest pieces of equipment would be the excavator (85 dBA at a distance of 50 feet) and truck (88 dBA at a distance of 50 feet). The combined noise level from these two pieces of equipment would be 90 dBA at a distance of 50 feet. Using the recommended FTA construction noise limits, any construction activity that occurred within 50 feet of a residential receptor would result in a noise impact during daytime hours. For commercial and industrial areas, the FTA daytime construction noise impact criterion is 100 dBA.

Construction noise levels are not expected to exceed the FTA recommended construction noise limits; therefore, construction noise mitigation measures are not required. Nevertheless, CTA would limit nighttime construction near residences to the extent practicable. All construction equipment exhaust mufflers would be kept in a state of good repair. To the maximum extent

possible, vehicles that are not in use would not remain idling on the construction site. As a result of these BMPs, the impacts would be considered not adverse.

6.6.3 Halsted Rail Alternative

Construction impacts from the Halsted Rail Alternative and the 119th Street yard and shop would be the same as those described for the UPRR Rail Alternative.

6.7 Safety and Security

The following is a summary of construction impacts described in the *Safety and Security Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API for the safety and security evaluation includes a ½-mile radius centered on each of the proposed station and stop locations as well as the existing 95th Street Terminal. One-half mile is an approximation of the distance most patrons would walk to a station and is used to measure general pedestrian safety and security in the surrounding neighborhood.

6.7.1 Bus Rapid Transit Alternative

The BRT Alternative would primarily involve the construction of bus shelters, sidewalks, and parking facilities. While there is always a chance that a contractor could fail to follow all safety and security rules, the limited scope of work is likely to minimize the risk of incidents resulting in fatalities, injuries, or criminal acts such as vandalism or theft on construction sites.

6.7.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

The extensive scope of work for this alternative would create a need for a large number of contractors in many areas over a long time period. To mitigate risks of safety and security incidents, contractors would be expected to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with any other relevant aspects of the CTA's *Safety and Security Management Plan* (CTA 2011b) or other manuals and policies.

Road closures and detours during construction would affect emergency services. Emergency services would be able to access construction sites at all times in the same way contractors access the sites. Emergency service providers crossing the tracks would have to use recommended detours, just as with any roadway construction project. As mitigation, neither adjacent roadways nor adjacent through streets operating in the same direction would be closed simultaneously. Emergency services would be able to access construction sites at all times in the same way contractors access the sites. An access road for the MWRD would be constructed prior to the new CTA tracks if necessary to maintain access to the MWRD facility. This roadway could also be used by emergency services. The impacts would be not substantially adverse. The 120th Street yard and shop would be within the same area, and the impacts would not be adverse.

As mitigation, traffic management plans would be created during the final engineering phase of the project to identify detour and emergency access routes, which would generally follow the nearest arterial or collector streets. Contractors would also follow the *Manual on Uniform Traffic*

*Control Devices (*FHWA 2009*)* design standards for temporary traffic control and would obtain all required local permits.

6.7.3 Halsted Rail Alternative

The extensive scope of work for this alternative would create a need for a large number of contractors in many areas over a long time period. To mitigate risks of safety and security incidents, contractors would be expected to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with any other relevant aspects of the CTA's Safety and Security Management Plan an or other manuals and policies (CTA 2011b).

Construction work would be phased to minimize traffic impacts on Halsted Street and adjoining streets; however, elevated structure construction would require lane and street closures and superstructure erection would require temporary shutdown of all traffic along portions of Halsted Street. In order to maintain emergency access on cross-streets, only short segments of Halsted Street (less than ½ mile long) would be closed at any given time. Emergency services would need to access construction sites in the same way as contractors, by using various side streets and recommended detours. The impacts would be not substantially adverse. Mitigation would be the same as that described for the UPRR Rail Alternative.

6.8 Historic and Cultural Resources

The following is a summary of construction effects described in the *Historic and Cultural Resources Technical Memorandum*. Effects would be confirmed and considered within the Section 106 process as the preferred alternative selection and design progresses. The area of potential effect (APE) for the RLE Project was delineated considering the location of the proposed alternatives; the potential for ground disturbance, destruction, or property taking; locations from which the undertaking may be visible and/or audible; and the scale and setting of the project. Generally, the APE contains those parcels within a block of the centerlines for the UPRR and Halsted Rail Alternatives, and widens to accommodate the locations of park & ride facilities and a proposed rail yard. The APE for the BRT Alternative includes the area immediately surrounding the park & ride and parking garage locations.

6.8.1 Bus Rapid Transit Alternative

Two resources near the BRT corridor have been identified as eligible for the National Register of Historic Places (NRHP): the Venetian Hall at 133-139 E. Kensington Avenue and the Altgeld Gardens Housing Project at 927 E. 131 Street. While construction activities would likely be perceptible at the Venetian Hall, it is not anticipated to adversely affect the characteristics that qualify the resource for inclusion on the NRHP. Visual, noise, vibration, and construction effects are not anticipated to affect the characteristics that qualify Altgeld Gardens Housing Project for inclusion on the NRHP.

6.8.2 Union Pacific Railroad Rail Alternative

The effects would be similar in nature for all UPRR Rail Alternative Options and for the 120th Street yard and shop. Six resources near the UPRR corridor have been identified as NRHP eligible:

the eclectic neo-traditional residence at 444 W. 100th Place, the fire station at 324 W. 104th Street, the Roseland Pumping Station at 351 W. 104th Street, the Romanesque revival church at 10920 S. Princeton Avenue, the Venetian Hall at 133-139 E. Kensington Avenue, and the Altgeld Gardens Housing Project. Visual, noise, vibration, and construction effects are not anticipated to affect the characteristics that qualify these six resources for inclusion on the NRHP. Given that the Roseland Pumping Station is within 50 feet of the alignment, a barrier wall could be constructed for protection of this resource.

6.8.3 Halsted Rail Alternative

Based on preliminary analysis, the Halsted Rail Alternative would result in adverse effects on four historic resources: the Classical Revival CTA substation at 10227 S. Halsted Street, S.S. Peter & Paul Catholic Church at 12433 - 12439 S. Halsted Street, the fire station (Engine Co. 115) at 11940 S. Peoria Street, and the Cedar Park Cemetery gatehouse/entryway at 12540 S. Halsted Street. Although none of these structures would be physically demolished, the scale and proximity of the construction activities are anticipated to have an adverse effect on the characteristics that qualify each resource eligible for NRHP listing. None of the other alternatives are anticipated to result in adverse effects on other historic resources. Please refer to the Permanent Impacts section of the *Historic and Cultural Resources Technical Memorandum*.

6.9 Hazardous Materials

The following is a summary of construction impacts described in the *Hazardous Materials Technical Memorandum*. More detailed information on potential hazardous sites and mitigation may be found in the resource-specific technical memorandum. The API for the hazardous materials evaluation extends out to ¼ mile from the project limits. Approximate soil/hazardous material removal quantities presented in this section were based on the horizontal and vertical extent of the excavation required for the alternative and the extent of the identified contamination from historical records. The quantities presented in each of the descriptions are estimates and would require field verification during construction activities.

6.9.1 Bus Rapid Transit Alternative

Subsurface excavation associated with the BRT Alternative would occur during construction of proposed parking facilities for the 103rd Street, 111th Street, Kensington Avenue and 130th Street bus stops. Construction of this alternative would result in generation of a large quantity of soil that could contain contaminated materials requiring off-site disposal.

One “High Concern” site was identified near the proposed 130th Street park & ride location and is an operating wastewater treatment plant. Sludge, a byproduct of the wastewater treatment process, typically contains heavy metals and other contaminants and may be present throughout the site, including within the footprint of the proposed park & ride facility at 130th Street.

Construction of park & ride facilities at 103rd Street and Kensington Avenue would include demolition of existing structures that were likely constructed before 1978–1979. These structures potentially contain asbestos-containing material and lead-based paint that could result in a release of asbestos fibers and lead dust during construction. Hazardous materials typically

involved with construction activities, such as paints, solvents, fuels and hydraulic fluids, could also be accidentally released during construction.

Numerous mitigation measures for the BRT Alternative would be used to avoid and minimize impacts prior and during construction. In addition, a Phase I Environmental Site Assessment (ESA) of any property to be purchased would be conducted as part of the Final EIS to identify recognized environmental conditions and assess and limit environmental liability. Based on the Phase I ESA findings, a Phase II ESA could also be required during the property acquisition phase and prior to purchasing a property. After mitigation, the construction impacts would be considered not adverse.

6.9.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

The UPRR ROW Option would require approximately 270,200 cubic yards of soil or aggregate excavation, and there would be the potential to encounter hazardous materials. The ROW Option would also include construction within the UPRR corridor, which is potentially impacted from the use of fuel, oil, paints, herbicides and pesticides, creosote, polynuclear aromatic hydrocarbons and coal ash associated with the long-term operation as a railroad. If groundwater is encountered during construction, there is the potential that it may contain hazardous materials as well. The ROW Option also would include the demolition of existing structures that were likely constructed before 1978–1979. These structures potentially contain asbestos-containing material and lead-based paint that could result in a release of asbestos fibers and lead dust during construction.

The ROW contains one “High Concern” site within the proposed permanent envelope. Three additional “High Concern” sites would be within the 120th Street Yard and Shop.

The ROW would potentially include two Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)-Archived sites within the permanent envelope. The CERCLIS sites come with increased risk of the United States Environmental Protection Agency (USEPA) imposing liability and remediation obligations on potentially responsible parties. These sites have Archived status, which means USEPA has completed its assessment of the site and has determined that no future action would be taken to list it on the National Priorities List and removed it from their inventory of Superfund sites. This does not, however, mean that a site is considered clean, and additional caution would be taken before acquiring ownership. Construction of the 120th Street yard and shop would require approximately 138,100 cubic yards of soil or aggregate excavation, some of which would be associated with two hazardous material sites: the Keywell site at 11900 Cottage Grove Avenue and the Penn Central Corp./Lake Calumet Quad at 810 E. 124th Street. There would therefore be the potential to encounter hazardous materials, whether from the sites identified or from the presence of urban fill. For additional information for these sites, please refer to the *Hazardous Materials Technical Memorandum*, May 22, 2013.

Proposed mitigation measures for construction impacts on hazardous materials would be similar to those of the BRT Alternative, including Phase I ESA and Phase II ESA of any properties needed

for the proposed permanent envelope. After mitigation, the construction impacts would be considered not adverse.

6.9.3 Union Pacific Railroad Rail Alternative - East Option

The UPRR East Option would require approximately 122,900 cubic yards of soil or aggregate excavation. Construction impacts and mitigation would be similar to those under the UPRR ROW Option. The East Option would include three "High Concern" sites within its permanent envelope. Three additional "High Concern" sites would be within the 120th Street Yard and Shop. Construction impacts and mitigation for the 120th Street yard and shop would be similar to those for the UPRR ROW Option.

6.9.4 Union Pacific Railroad Rail Alternative - West Option

The UPRR West Option would require approximately 129,400 cubic yards of soil or aggregate excavation. Construction impacts and mitigation would be similar to those under the UPRR ROW Option. The West Option would include three "High Concern" sites within its permanent envelope. Three additional "High Concern" sites would be within the 120th Street Yard and Shop. Construction impacts and mitigation for the 120th Street yard and shop would be similar to those for the UPRR ROW Option.

6.9.5 Halsted Rail Alternative

The Halsted Rail Alternative would require approximately 141,300 cubic yards of soil or aggregate excavation, and there would be the potential to encounter hazardous materials. If groundwater is encountered during construction, it may contain hazardous materials as well. Construction of the Halsted Alternative would include the demolition of existing structures that were likely constructed before 1978–1979. These structures potentially contain asbestos-containing material and lead-based paint that could result in a release of asbestos fibers and lead dust during construction. Hazardous materials typically involved with construction activities, such as paints, solvents, fuels and hydraulic fluids, could also be accidentally released during construction.

Construction of the 119th Street yard and shop would require approximately 129,100 cubic yards of soil or aggregate excavation, and there would be the potential to encounter hazardous materials. Six "High Concern" sites are within the permanent envelope of the 120th Street yard and shop. One CERCLIS site (Ingersoll Industrial Site at 1000 W. 120th Street) and one CERCLIS-No Further Remediation Planned site are within the permanent envelope. There is also an active CERCLIS site (Dutch Boy Paint Site at 1200 Peoria Avenue) adjacent to the 119th Street yard and shop location, and it has the potential for offsite migration of contamination.

Construction of the 119th Street yard and shop would include the demolition of existing structures that were constructed before 1978–1979. These structures potentially contain asbestos-containing material and lead-based paint that could result in a release of asbestos fibers and lead dust during construction. Hazardous materials typically involved with construction activities, such as paints, solvents, fuels and hydraulic fluids, could also be accidentally released during construction.

Proposed mitigation measures for construction impacts on hazardous materials would be similar to those of the BRT Alternative, including Phase I ESA and Phase II ESA of any properties needed for the proposed permanent envelope. After mitigation, the construction impacts would be considered not adverse.

6.10 Air Quality

The following is a summary of construction impacts described in the *Air Quality Technical Memorandum*. More detailed information on potential air quality impacts and mitigation may be found in the resource-specific technical memorandum. The API for air quality has both a regional and a local component. The regional component follows the analysis area adopted by the traffic analysis, which is a corridor bounded on the south by a varying boundary that includes 134th Street, on the north by 91st Street, on the west by a varying boundary that includes Halsted Street, and on the east by a varying boundary that includes I-94. The local component would be limited to the individual stations, their associated parking facilities, and nearby intersections affected by traffic entering and exiting the stations.

The air quality impacts from construction would be similar in nature for all build alternatives, as well as their respective segments, the 120th Street yard and shop, and the 119th Street yard and shop; however, the schedule for construction activities would be longer for the UPRR Rail Alternative and the Halsted Rail Alternative than with the BRT Alternative.

Emissions from construction equipment would occur during site preparation activities such as grading, installing curbs, or grubbing and removal of vegetation to prepare a site for construction. Compared with emissions from other motor vehicles sources in the project area, direct emissions from construction equipment and trucks would not likely have the potential to exceed any ambient air quality standards.

Impacts during construction would be primarily associated with fugitive dust and emissions from on-road and non-road vehicles. The equipment producing these emissions would include haul trucks, concrete trucks, front-end loaders, excavators, cranes, drill rigs, compressors, flatbed trucks, and generators. Most state air quality agencies, including Illinois Environmental Protection Agency, have strict guidelines for controlling fugitive dust (usually by good housekeeping practices), diesel particulate emissions (by exhaust emission controls and use of low sulfur fuels), and greenhouse gas emissions (by limiting equipment operations such as excessive idling and by using alternative fuels).

Construction activities would also result in traffic disruption, rerouting, and temporary shutdown of traffic. Traffic disruption, such as decreased roadway capacity or detouring, can lead to increased traffic congestion, thereby increasing motor vehicle exhaust emissions on nearby roadways, and resulting in localized elevated pollutant concentrations. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval.

Proper traffic management during the construction period would mitigate any potential adverse impacts. Traffic management would include finding less congested routes for construction-related

truck traffic, creating temporary detours for regular roadways where capacities were diminished, providing traffic control, routing trucks away from residential neighborhoods, and restricting construction activities during hours of high traffic volumes on the existing roadways. Staging areas and worker parking areas would be established away from sensitive receptors, where possible.

Many state agencies such as IDOT require the contractor to develop a Dust Control Plan that would address in detail how dust would be controlled at all times at the construction site, the staging areas, and the access and egress routes. The agencies also require all diesel-powered equipment and vehicles to be retrofitted with emissions control devices and to use ultra-low sulfur diesel to control diesel particulate emissions.

CTA would require the contractor to develop a plan and schedule to allow construction trucks to access and egress the construction sites and staging areas without excessive disruption and impacts on residences and commercial establishments.

With the use of appropriate mitigation measures as described above, no violations of any of the Illinois or National Ambient Air Quality Standards are anticipated; therefore, no adverse air quality impacts due to construction activities are anticipated.

6.11 Water Resources

The following is a summary of construction impacts described in the *Water Resources Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. The API for the water resources extends 500 feet on either side of the project alternative centerlines. Because the project would occur in a highly urbanized environment, the impacts of construction on water resources would not be expected to extend beyond 500 feet. The affected water resources include stormwater, groundwater, water quality, and wetlands. There are no floodplains in the API.

6.11.1 Bus Rapid Transit Alternative

The physical modifications associated with the BRT Alternative would result in potential impacts on the existing stormwater drainage infrastructure, particularly where park & ride lots and structures would be constructed. These alterations would not greatly affect the direction or volume of drainage through the API.

There would be a potential need for dewatering (by removing groundwater from the construction site by pumping) if groundwater were encountered during construction. Dewatering during construction could temporarily affect local shallow groundwater levels. Given the likelihood of encountering contaminated groundwater, compliance with federal, state, and local laws and regulations would be required during construction.

The impacts from construction of the BRT Alternative on water quality would be minor because the project area is already highly urbanized. In order to ensure that surface water runoff would not have adverse impacts on water quality, human health, or safety, appropriate mitigation measures would be taken to control runoff during implementation.

6.11.2 Union Pacific Railroad Rail Alternative

The potential construction impacts and mitigation would be similar for the UPRR Rail Alternative options and the 120th Street yard and shop. The physical modifications associated with the UPRR Rail Alternative would result in impacts on the existing stormwater drainage infrastructure; however, these alterations would not greatly affect the direction of drainage through the project area and would not change drainage within the watershed. Care would need to be taken during construction in the vicinity of the Roseland Pump Station at 104th Street, as well as the other underground utilities, in order to avoid damaging existing structures.

The impacts from construction of UPRR Rail Alternative on groundwater and water quality would be the same as for the BRT Alternative.

Approximately 27 acres of potential wetlands exist in the vicinity of the UPRR Alternative alignment; however, there would be no temporary construction impacts on wetlands associated with the UPRR Rail Alternative options. Addition information concerning wetlands in the project area is provided in the *Water Resources Technical Memorandum*.

At the 120th Street yard and shop location, physical modifications would result in impacts on the existing stormwater drainage infrastructure; however, these alterations would not greatly affect the direction of drainage through the project area. The potential impacts on groundwater, water quality, and wetlands would be similar to those described under the BRT Alternative.

6.11.3 Halsted Rail Alternative

The physical modifications associated with the Halsted Rail Alternative would result in impacts on the existing stormwater drainage infrastructure; however, these alterations would not greatly affect the direction of drainage through the project area and would not change drainage to the watershed. The potential impacts on groundwater and water quality would be similar to those described under the BRT Alternative. Because there are no wetlands within the API, there would be no construction impacts on wetlands.

At the 119th Street yard and shop location, physical modifications would result in impacts on the existing stormwater drainage infrastructure; however, these alterations would not greatly affect the direction of drainage through the project area and would not change drainage to the watershed. The potential impacts on groundwater and water quality would be similar to those described under the BRT Alternative. Because there are no wetlands at the 119th Street yard and shop site, there would be no construction impacts on wetlands.

6.12 Vegetation and Wildlife Habitat

The following is a summary of construction impacts described in the *Biological Resources Technical Memorandum*. The impact findings are highlighted here, while detailed information on potential mitigation may be found in the resource-specific technical memorandum. For potential impacts on threatened and endangered species, designated critical habitats, vegetation, and other wildlife habitats, the API includes the area within ¼ mile of the proposed alignments, stations, parking facilities, and maintenance yards for each of the project alternatives. Given that the

project is in a highly urbanized environment with high existing levels of noise, light, and human activity, the impacts of construction and operation on available habitats and associated wildlife would not be expected to extend beyond ¼ mile.

6.12.1 Bus Rapid Transit Alternative

A small number of trees would likely be removed as a result of park & ride construction activities under the BRT Alternative. Construction impacts under the BRT Alternative would include potential adverse impacts on the following vegetation and wildlife habitat resources:

- The urban tree inventory, due to tree removal. This impact would be reduced to a not adverse level by compliance with local tree protection regulations.
- Migratory birds wherever tree clearing occurs. This impact would be reduced to a not adverse level by the implementation of mitigation measures.

Mitigation measures would be required for compliance with the Migratory Bird Treaty Act and local tree protection ordinances, and to reduce potential impacts on wildlife habitat. Bird species that may utilize those trees that could be removed or disturbed during construction could be affected. Potential mitigation measures would include the following:

- Tree removal would be timed as much as possible to occur outside the migratory bird nesting season, which occurs generally from April 1–September 15 and as early as March 1.
- If construction must occur during the nesting season, two biological surveys would be conducted: one 15 days prior and a second 72 hours prior to the construction that would remove or disturb suitable nesting habitat. If a protected bird were found, surveys would be continued in order to locate any nests. If an active nest were located, construction within 300 feet of the nest would be postponed until the nest is vacated and juveniles have fledged and when there is no evidence of a second attempt at nesting.
- Avoidance measures would be incorporated into the design of the project during preliminary engineering where feasible. If construction of the project requires removal of a protected tree, a permit would be required in accordance with applicable local codes and ordinances of the city in which the affected tree is located. Tree removal permits may require replanting of protected trees within the project area or at another location to mitigate for the removal of these trees. Replanting would be done according to the ratios required by tree removal permits.

6.12.2 Union Pacific Railroad Rail Alternative Options

Trees would likely be removed as a result of construction activities for the UPRR Rail Alternative and the 120th Street yard and shop. Most of the removal would likely occur at the park & ride facilities, and in the median of the interstate just south of the 95th Street Terminal. The potential impacts and mitigation would be similar to those described for the BRT Alternative.

6.12.3 Halsted Rail Alternative

A number of trees would likely be removed as a result of construction activities for the Halsted Rail Alternative and the 119th Street yard and shop. Most of the removal would likely occur from the Halsted Street median and sidewalks. Suitable habitat for listed plant species does not appear to be present in the API. The potential impacts and mitigation would be similar to those described for the BRT Alternative.

6.13 Energy

The proposed alternatives would require energy consumption to support construction activities; however, the approximate quantities used would not be substantial when compared to the annual consumption for Cook County, and would not have an adverse impact on regional energy or fuel supplies. Construction BMP would be implemented to ensure minimization of energy usage.

6.13.1 Bus Rapid Transit Alternative

Energy impacts from construction activities were computed based on typical values for construction categories. Table 6-1 provides a summary for the BRT Alternative. As construction energy use would be a very small fraction of energy use in the region (91 billion British thermal units [BTU] for construction of the BRT Alternative compared to 530 trillion BTU annual energy use in Cook County, or less than 0.02 percent of the Cook County annual energy use), no impact would occur and no mitigation is proposed. (No impact is concluded because 0.02 percent variation is well within the variations in annual energy use due to variations in average temperature and fluctuations in regional employment and manufacturing.)

Table 6-1: Estimated Energy Consumption from Construction Activities - Bus Rapid Transit Alternative

Construction Component	BTU/2012$	Construction Estimate (2012 $1,000)	Billion BTU	Typical Elements
Guideway	5,940	239	1	Concrete, Reinforcing Steel
Stations	5,940	702	4	Concrete, Reinforcing Steel, Canopy, Conduits, Lighting Fixtures
Maintenance Facilities	7,310	0	0	Maintenance Building, Equipment, Heating, Ventilation, Air Conditioning
Site Work	5,940	7,990	48	Earthwork, Removals, Utility Relocations
Systems	9,130	4,130	38	Signals, Fare Vending, Communications, Traffic Signal Priority System
Total Estimated Construction BTU			91	

BTU - British thermal units

6.13.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

Energy impacts from construction activities were computed based on typical values for construction categories. Construction energy use would vary slightly between the UPRR options.

Table 6-2 provides a summary of the energy use during construction for the UPRR Rail Alternative ROW Option. The construction energy use would be a very small fraction of energy use in the region (approximately 6 trillion BTU compared to the total annual Cook County energy consumption of 530 trillion BTU, less than 1.2 percent of the total annual Cook County energy consumption).

Table 6-2: Estimated Energy Consumption from Construction Activities - Union Pacific Railroad Rail Alternative - Right-of-Way Option

Construction Component	BTU/2012$	Construction Estimate (2012 $1,000)	Billion BTU	Typical Elements
Track and Guideway	5,940	264,000	1,568	Structural Steel, Track, Concrete, Reinforcing Steel
Stations	5,940	186,000	1,105	Concrete, Reinforcing Steel, Canopy, Conduits, Lighting Fixtures, Glass
Maintenance Facilities	7,310	71,000	519	Maintenance Building, Equipment, Heating, Ventilation, Air Conditioning
Site Work	5,940	133,000	790	Earthwork, Removals, Utility Relocations
Systems	9,130	239,000	2,182	Signals, Fare Vending, Communications, Traction Power, Substations
Total Estimated Construction BTU			6,164	

BTU - British thermal units

6.13.3 Union Pacific Railroad Rail Alternative - East Option

For the UPRR Rail Alternative East Option, Table 6-3 provides a summary of construction-related energy use. Construction energy use would be a very small fraction of the energy use in the region (approximately 6 trillion BTU compared to the total annual Cook County energy consumption of 530 trillion BTU, less than 1.2 percent of the total annual Cook County energy consumption).

Table 6-3: Estimated Energy Consumption from Construction Activities - Union Pacific Railroad Rail Alternative - East Option

Construction Component	BTU/2012$	Construction Estimate (2012 $1,000)	Billion BTU	Typical Elements
Track and Guideway	5,940	263,000	1,562	Structural Steel, Track, Concrete, Reinforcing Steel
Stations	5,940	189,000	1,123	Concrete, Reinforcing Steel, Canopy, Conduits, Lighting Fixtures, Glass
Maintenance Facilities	7,310	71,000	519	Maintenance Building, Equipment, Heating, Ventilation, Air Conditioning
Site Work	5,940	136,000	808	Earthwork, Removals, Utility Relocations
Systems	9,130	240,000	2,191	Signals, Fare Vending, Communications, Traction Power, Substations
Total Estimated Construction BTU			6,203	

BTU - British thermal units

6.13.4 Union Pacific Railroad Rail Alternative - West Option

Table 6-4 provides a summary of construction-related energy use for the UPRR Rail Alternative West Option. Construction energy use would be a very small fraction of the energy use in the region (approximately 6 trillion BTU compared to the total annual Cook County energy consumption of 530 trillion BTU, less than 1.2 percent of the total annual Cook County energy consumption).

Table 6-4: Estimated Energy Consumption from Construction Activities - Union Pacific Railroad Rail Alternative - West Option

Construction Component	BTU/2012$	Construction Estimate (2012 $1,000)	Billion BTU	Typical Elements
Track and Guideway	5,940	269,000	1,598	Structural Steel, Track, Concrete, Reinforcing Steel
Stations	5,940	195,000	1,158	Concrete, Reinforcing Steel, Canopy, Conduits, Lighting Fixtures, Glass
Maintenance Facilities	7,310	71,000	519	Maintenance Building, Equipment, Heating, Ventilation, Air Conditioning
Site Work	5,940	137,000	814	Earthwork, Removals, Utility Relocations
Systems	9,130	237,000	2,164	Signals, Fare Vending, Communications, Traction Power, Substations
Total Estimated Construction BTU			6,253	

BTU - British thermal units

6.13.5 Halsted Rail Alternative

Table 6-5 provides a summary of construction energy use for the Halsted Rail Alternative. Construction energy use would be a very small fraction of energy use in the region (approximately 7 trillion BTU compared to the total annual Cook County energy consumption of 530 trillion BTU, less than 1.3 percent of the total annual Cook County energy consumption).

Table 6-5: Estimated Energy Consumption from Construction Activities - Halsted Rail Alternative

Construction Component	BTU/2012$	Construction Estimate (2012 $1,000)	Billion BTU	Typical Elements
Track and Guideway	5,940	424,000	2,519	Structural Steel, Track, Concrete, Reinforcing Steel
Stations	5,940	140,000	832	Concrete, Reinforcing Steel, Canopy, Conduits, Lighting Fixtures, Glass
Maintenance Facilities	7,310	62,000	453	Maintenance Building, Equipment, Heating, Ventilation, Air Conditioning
Site Work	5,940	109,000	647	Earthwork, Removals, Utility Relocations
Systems	9,130	265,000	2,419	Signals, Fare Vending, Communications, Traction Power, Substations
Total Estimated Construction BTU			6,870	

BTU - British thermal units

6.14 Environmental Justice

A majority of the project area consists of minority populations; some of which are low-income populations as well. Because all of the impacts and benefits would occur in the same communities for all the alternatives, none of the construction impacts would be disproportionately adverse to these populations. Temporary construction easements would not result in displacements or relocations. No Environmental Justice mitigation would be required beyond that which is proposed in the other technical memoranda.

6.15 Transportation

During construction, vehicles, pedestrians, buses, and trains may need to be rerouted around the construction sites. Rerouting of traffic may be done using detours and/or complete street closures. The street closures could include main streets and side streets, as well as alleys and access points. Station and viaduct construction activities would be sequenced around street and alley closures. Temporary traffic lanes, temporary access points, or staged construction would be used. The following activities would be part of the traffic rerouting activities:

- Construction signage and temporary traffic barriers.
- Temporary reductions in number of thru-traffic lanes in each direction from two to one, if feasible.
- Detours/complete street closures, including alleys and access points.
- Temporary traffic lanes.
- Designated space for storage and staging of construction materials, equipment, and temporary facilities within the ROW, including parking areas or maintenance yard.
- Construction vehicle access points within and/or adjacent to the ROW.
- Business, residential, and pedestrian impacts including limited parking or parking bans.
- Advance trackwork and signalization to facilitate train reroutes (for the rail alternatives).
- Alternate bus routes and temporary CTA service changes may be required during construction of the RLE Project at the 95th Street Terminal.
    - CTA track shutdowns during nights or weekends may be required (for the rail alternatives).
    - Trains would operate on one or two tracks through the construction zones (for the rail alternatives). Flagmen would be required to notify trains of construction activities.

6.15.1 Bus Rapid Transit Alternative

6.15.1.1 Public Transportation

The BRT Alternative would include construction of improved bus shelters at four locations, four park & ride parking lots, and one proposed traffic signal. Existing traffic signals would be reprioritized. The construction activities associated with this alternative would temporarily affect the physical capacity of roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute bus transit service and move stop locations. With adherence to local, state, and federal construction and temporary traffic and public transportation management guidelines, no adverse impacts would result from construction of the BRT Alternative.

6.15.1.2 Traffic

The construction activities associated with this alternative would temporarily affect the physical capacity of local roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute traffic during construction. With adherence to local, state, and federal construction and temporary traffic management guidelines, no adverse impacts would result from construction of the BRT Alternative.

6.15.1.3 Freight Transportation

Construction of the proposed parking lot northeast of the UPRR tracks may require flagging safety near train operations; however, track closures would not be required. Construction activities would be phased to ensure that impacts on freight trains are minimized.

6.15.1.4 Bicycle

Temporary construction impacts for bicycles associated with the BRT Alternative may occur at the locations of new bus shelters and surface parking lots. Some construction activities may reduce the capacity of the roadway due to maintenance of traffic during construction activities. This may lead to increased travel times for bicyclists; however, there are no existing or proposed bicycle routes along Michigan Avenue, the proposed alignment of the BRT Alternative.

6.15.1.5 Pedestrian

Temporary construction impacts for pedestrians associated with the BRT Alternative would occur at the locations of the four upgraded bus shelters and park & ride lots. Some construction activities may result in a temporary sidewalk closure on one side of the street.

6.15.1.6 Parking Facilities

On-street parking along the roadways would be temporarily affected for construction of park & ride lots and bus shelters due to maintenance of traffic during construction activities.

6.15.2 Union Pacific Railroad Rail Alternative - Right-of-Way Option

6.15.2.1 Public Transportation

The construction activities associated with the UPRR Rail Alternative ROW Option would temporarily affect the physical capacity of roadways and intersections, requiring detours. Train

and bus service, include Pace service, at the 95th Street Terminal may also be affected. These impacts may lead to increased travel times and possible shift in traffic volumes and increase travel times for bus transit users. Bus stop locations may be eliminated or relocated temporarily and buses may be rerouted during construction activities. With adherence to local, state, and federal construction and temporary traffic and public transportation management guidelines, no adverse impacts would result from construction of the UPRR Alternative ROW Option.

The UPRR Alternative ROW Option would consist of new construction of dual-track, elevated structure within the UPRR ROW, branching off and running along the east side of the corridor and over existing CN/ME tracks. Construction at the CN/ME crossing would be phased to ensure there are no impacts on Metra operations. During new track roadbed construction for the 120th Street yard and shop and the new access road for the existing MWRD facility, construction over and adjacent to the NICTD/CSS & SBRR would occur. During these construction activities, flagging operations and scheduled track closures would occur. Construction would be phased to ensure there are no impacts on passenger trains.

6.15.2.2 Traffic

The construction activities associated with this alternative would temporarily affect the physical capacity of local roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute traffic during construction.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-94.

Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-57.

With adherence to local, state, and federal construction and temporary traffic management guidelines, no adverse impacts would result from construction of the UPRR ROW Alternative.

6.15.2.3 Freight Transportation

The UPRR ROW Alternative would consist of new construction of a dual-track, elevated structure within the UPRR corridor, branching off and running along the east side of the corridor and over existing CN/ME tracks. There would be no impact on UPRR operations due to construction activities, because UPRR trains would be relocated to another corridor as part of a separate, earlier project. Construction at the CN/ME crossing would be phased to minimize the impacts on CN and Metra operations.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-94.

Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-57.

During new track roadbed construction for the 120th Street yard and shop and the new access road for the existing MWRD facility, construction over and adjacent to the NICTD/CSS & SBRR would occur. During these construction activities, flagging operations and scheduled track closures would occur. Construction would be phased to minimize impacts on freight operations.

A portion of the new track alignment would be constructed over abandoned Indiana Harbor Belt Railroad (IHB) tracks north of 130th Place. Construction activities would be coordinated with IHB to ensure that no construction activities would affect freight operations.

6.15.2.4 Bicycle

Bicyclists using recommended collector streets such as 103rd Street, 111th Street, or Michigan Avenue may incur increased travel times due to detours or increase vehicular traffic due to construction activities.

6.15.2.5 Pedestrian

During construction of the aerial structure and stations, some sidewalks would need to be temporarily closed. Increased travel distance and time may be incurred due to pedestrian traffic reroutes.

6.15.2.6 Parking Facilities

On-street parking would be temporarily affected during construction of the aerial structure and stations. Construction of park & ride lots would also contribute to temporary on-street parking loss due to maintenance of traffic during construction activities.

6.15.3 Union Pacific Railroad Rail Alternative - East Option

6.15.3.1 Public Transportation

Potential construction impacts on public transportation associated with the UPRR East Option would be the same as those of the UPRR ROW Option.

6.15.3.2 Traffic

The construction activities associated with this alternative would temporarily affect the physical capacity of local roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute traffic during construction. Please refer to the *Transportation Technical Memorandum* for additional traffic information.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-94.

The UPRR Alternative East Option alignment curves over I-57 and runs parallel to the UPRR tracks. Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-57.

With adherence to local, state, and federal construction and temporary traffic management guidelines, no adverse impacts would result from construction of the UPRR Alternative East Option.

6.15.3.3 Freight Transportation

The UPRR Alternative East Option would consist of new construction of dual-track, elevated structure immediately adjacent to and east of the UPRR ROW, branching off and running along the east side of the corridor and over existing CN/ME tracks. The East Option would require the construction activities to occur while UPRR tracks are operational. The work would be sequenced along the UPRR corridor to minimize impacts on UPRR operations. Construction adjacent to railroads would require flagging operations and scheduled track closures. Construction at the CN/ME crossing would be phased to minimize the impacts on CN freight operations.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-94.

The UPRR Alternative East Option alignment curves over I-57 and runs parallel to the UPRR tracks. Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may

temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-57.

During new track roadbed construction for the 120th Street yard and shop and the new access road for the existing MWRD facility, construction over and adjacent to the NICTD/CSS & SBRR would occur. During these construction activities, flagging operations and scheduled track closures would occur. Construction would be phased to minimize impacts on freight operations.

A portion of the new track alignment would be constructed over abandoned IHB tracks north of 130th Place. Construction activities would be coordinated with IHB to ensure that no construction activities would affect freight operations.

6.15.3.4 Bicycle

The bicycle impacts of the UPRR Alternative East Option would be similar to those of the UPRR Alternative ROW Option.

6.15.3.5 Pedestrian

The pedestrian impacts of the UPRR Alternative East Option would be similar to those of the UPRR Alternative ROW Option.

6.15.3.6 Parking Facilities

The parking facility impacts of the UPRR Alternative East Option would be similar to those of the UPRR Alternative ROW Option.

6.15.4 Union Pacific Railroad Rail Alternative - West Option

6.15.4.1 Public Transportation

Potential construction impacts on public transportation associated with the UPRR West Option would be the same as those of the UPRR ROW Option.

6.15.4.2 Traffic

The construction activities associated with this alternative would temporarily affect the physical capacity of local roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute traffic during construction.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-94.

Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize

impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-57.

With adherence to local, state, and federal construction and temporary traffic management guidelines, no adverse impacts would result from construction of the UPRR Alternative West Option.

6.15.4.3 Freight Transportation

The UPRR Alternative West Option would consist of new construction of dual-track, elevated structure crossing over the UPRR at Fernwood Parkway just south of I-57 and continuing immediately adjacent to and west of the UPRR ROW, crossing over the UPRR tracks again at Prairie Avenue and running along the east side of the corridor and over existing CN/ME tracks. The West Option would require the construction activities to occur while UPRR tracks are operational. This alternative would have two crossings over the active UPRR tracks that the East Option would not have: at Fernwood Parkway and Prairie Avenue. Construction at these crossings would be phased to minimize impacts on UPRR freight operations. Construction adjacent to railroads would require flagging operations and scheduled track closures. Construction activities would be phased to reduce impacts on the UPRR operations as much as possible. Construction at the CN/ME crossing would be phased to minimize the impacts on CN freight operations.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-94.

Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-57.

During new track roadbed construction for the 120th Street yard and shop and new access road for the existing MWRD facility, construction over and adjacent to the NICTD/CSS & SBRR would occur. During these construction activities, flagging operations and scheduled track closures would occur. Construction would be phased to minimize impacts on freight operations.

A portion of the new track alignment would be constructed over abandoned IHB tracks north of 130th Place. Construction activities would be coordinated with IHB to ensure that no construction activities would affect freight operations.

6.15.4.4 Bicycle

The bicycle impacts of the UPRR Alternative West Option would be similar to those of the UPRR Alternative ROW Option.

6.15.4.5 Pedestrian

The pedestrian impacts of the UPRR Alternative West Option would be similar to those of the UPRR Alternative ROW Option.

6.15.4.6 Parking Facilities

The parking facility impacts of the UPRR Alternative West Option would be similar to those of the UPRR Alternative ROW Option.

6.15.5 Halsted Rail Alternative

6.15.5.1 Public Transportation

The construction activities associated with the Halsted Rail Alternative would temporarily affect the physical capacity of roadways and intersections, requiring detours. Superstructure erection would require temporary shutdown of all traffic on Halsted Street, which may lead to increased travel times and a shift in traffic volumes, increasing travel times for bus transit users. Bus stop locations may be eliminated or relocated temporarily and buses rerouted, including Pace service, during construction activities. With adherence to local, state, and federal construction and temporary traffic and public transportation management guidelines, no adverse impacts would result from construction of the Halsted Rail Alternative.

The Metra Electric Blue Island line crosses Halsted Street between 120th Street and 122nd Street, and its West Pullman station is west of Halsted Street. Construction of the aerial structure would require temporary scheduled track closures and would be phased to minimize impacts on Metra operations.

6.15.5.2 Traffic

The construction activities associated with this alternative would temporarily affect the physical capacity of local roadways and intersections, which may lead to increased travel times and possible shift in traffic volumes and the need to reroute traffic during construction.

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-94.

Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize

impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase travel times along this portion of I-57.

The construction activities associated with the Halsted Rail Alternative would temporarily affect the physical capacity of roadways and intersections, requiring detours. Superstructure erection would require temporary shutdown, in segments, of all traffic on Halsted Street. This may lead to increased travel times and possible shift in traffic volumes, increasing travel times for those using Halsted Street.

With adherence to local, state, and federal construction and temporary traffic management guidelines, no adverse impacts would result from construction of the Halsted Rail Alternative.

6.15.5.3 Freight Transportation

Work within the median of I-94 would require temporary lane closures. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-94. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-94.

The Halsted Rail Alternative alignment crosses over the UPRR at Fernwood Parkway and I-57. Dual-track, elevated structures would be constructed through the I-94/I-57 interchange, across the WB I-57 entrance ramp from NB I-94, and within the I-57 corridor. For superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and during low-traffic-volume intervals per IDOT and CDOT approval. Proposed structure construction would be sequenced to minimize impacts on the traffic flow on I-57. Increased traffic congestion due to construction activities may temporarily increase freight truck travel times and cost for shipping routes that include this portion of I-57.

The construction activities associated with the Halsted Rail Alternative would temporarily affect the physical capacity of roadways and intersections requiring detours. Superstructure erection would require temporary shutdown of all traffic on Halsted Street. This may lead to increased travel times and possible shift in traffic volumes, increasing travel times for freight trucks using Halsted Street. There would be no construction impacts on rail freight transportation because no freight train tracks are near or cross the Halsted Rail Alternative Alignment.

6.15.5.4 Bicycle

Portions of the Major Taylor bike trail would need to be closed temporarily during the construction of the 119th Street station and the aerial structure. Bicycle travel times may increase due to detours or shifting of routes.

6.15.5.5 Pedestrian

During construction of the aerial structure and station construction, some sidewalks would need to be temporarily closed. Increased travel distance and time may be incurred due to pedestrian traffic reroutes.

6.15.5.6 Parking Facilities

On-street parking would be temporarily affected during construction of the aerial structure and stations. Parking would potentially be eliminated from Halsted Street during construction to increase traffic flow. Construction of park & ride lots would also contribute to temporary on-street parking loss due to maintenance of traffic during construction activities.

6.16 Cumulative Impacts

Construction impacts from the other potentially concurrent projects identified in the *Cumulative Impacts Technical Memorandum* would not be likely to result in cumulative impacts when combined with RLE Project construction. No cumulative construction impacts would occur and mitigation measures beyond those already identified for direct impacts due to construction would not be required. Should construction of other nearby projects occur simultaneously with the RLE Project, CTA would coordinate construction activities among the projects to minimize disruption and use of resources.

Section 7
Impacts Remaining After Mitigation

Because of the temporary nature of construction activities, the use of construction BMP, and proposed mitigation methods, the construction impacts from the build alternatives would be considered not adverse. No construction impacts would occur with the No Build Alternative and no mitigation measures would be required.

Section 8
References Cited

Chicago Transit Authority (CTA). Description of Construction and Phasing for Environmental Impact Statement Build Alternatives. November 2012.

Federal Highway Administration. Manual on Uniform Traffic Control Devices. 2009.

Appendix A
Construction Matrix

Note: The information shown in this table reflects construction assumptions for the purposes of NEPA analysis of impacts. It represents the types and order of magnitude of construction activities associated with each alternative. It is not meant to be a final construction plan. A specific construction plan for the preferred alternative presented in the Final EIS will be prepared as design of the project proceeds.

UPRR HRT ROW Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-1: 95th Street Station to Beginning of Horizontal Curve at UPRR (96+60 to 132+00)	**12-36**													
Advance Work														
Signal/cross-over installation; utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	12-18	x		x	x	x		x	x	6,830	50	500	1	5-10
Retained Embankment														
Single Track	24	x	x	x	x	x	x	x	x	1,750	1,750	500	5-10	10-15
Elevated Concrete Structure														
Single Track-Rehab/Modify Existing CTA/IDOT tunnel	24	x	x	x	x	x	x	x	x	2,600	1,300	500	5-10	10-15
Elevated Steel Structure														
Single Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	4,100	7,870	2,012,500	5-10	10-15
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,090	11,917	3,701,705	5-10	10-15
Segment U-2: Horizontal Curve at UPRR (132+00 to 142+19)	**12-30**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	600	1,174	364,700	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	1,000	2,070	1,825,800	5-10	10-15
Double Track - Straddle Bent Substructure	24-30	x	x	x	x	x	x	x	x	170	457	892,100	5-10	10-15
Segment U-3: End of Horizontal Curve to Metra/CN Crossing (142+19 to 286+12)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 103rd Street	24-36	x	x	x	x	x	x	x	x	7,800	9,967	3,484,100	5-10	20-30
Construct - 111th Street	24-36	x	x	x	x	x	x	x	x	7,800	9,967	3,484,100	5-10	20-30
Construct - Michigan Avenue	24-36	x	x	x	x	x	x	x	x	7,800	9,967	3,484,100	5-10	20-30
Parking														
Construct - 103rd Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - 111th Street	12	x	x	x	x	x		x	x	9,300	3,100		2-6	5-11
Construct - Michigan Avenue (2 lots)	24	x	x	x	x			x		18,600	6,200		2-7	5-12
Elevated Steel Structure														
Double Track - Hammerhead Substructure	36	x	x	x	x	x	x	x	x	43,200	84,528	26,258,400	50-100	30-35
Traction Power														
Substation - 175+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substation - 254+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

UPRR HRT ROW Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-4: Metra/CN Crossing to At Grade Track (286+12 to 310+03)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926		5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,300	12,327	3,829,350	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	400	895	730,320	5-10	10-15
Segment U-5: At Grade Track to 130th Street Station Options (310+03 to 360+02)	**12-36**													
Advance Work														
Utility relocation; staging	12													
At Grade														
Double Track	24-36	x	x	x	x	x	x	x	x	22,950			5-10	20-30
Access Road														
Crossing proposed tracks at 358+00	12-24	x	x	x	x			x		6,778	2,260		5-10	5-10
Bridge for Access Road, Crossing at 358+00	24	x	x	x	x	x		x	x	3,105	4,610	495,000	5-10	10-15
Connector access road, West of Proposed CTA tracks	12	x	x	x	x			x		717	239		5-10	5-10
Segment U-6S: 130th Street South Station Option (360+02 to 380+29)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Station														
Construct - 130th Street South Station Option	24-36	x	x	x	x	x	x	x	x	6,773	2,653	696,305	5-10	20-30
Parking														
Construct - 130th Street South Station Option	24	x	x	x	x			x					2-5	5-10
At Grade														
Double Track	24-36	x		x	x			x	x	5,400				
Triple Track	24	x		x	x			x	x	7,000				
Access Road														
At South Station Option	12-24	x	x	x	x			x		5,778	1,926		5-10	5-10
Segment U-6W: 130th Street West Station Option (380+29 to 395+40)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10

UPRR HRT ROW Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Station														
Construct - 130th Street West Station Option	24-36	x	x	x	x	x	x	x	x	3,148	1,565	467,055	5-10	20-30
Parking														
Construct - 130th Street West Station Option (2 lots)	24	x	x	x	x			x					2-5	5-10
At Grade														
Double Track	24-36	x		x	x			x	x	12,600				
Triple Track	24	x		x	x			x	x	6,300				
Access Road														
At West Station Option	12-24	x	x	x	x			x		6,512	2,171		5-10	5-10
Bridge for Access Road, Crossing at 371+00	24	x	x	x	x	x		x	x	1,553	2,305	247,500	5-10	10-15
Segment U-7: 120th Street Yard and Shop (291+85/45+00 to 352+69/106+12)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Access Road														
Construct	12-24	x	x	x	x			x		10,977	3,659		5-10	5-10
At Grade														
Single Track	36	x		x	x	x		x	x	89,500	1,000		5-10	10-15
Double Track	36	x		x	x	x		x	x	8,100			5-10	10-15
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926	500	5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	2,100	4,109	1,276,450	5-10	10-15
Shop Facility														
Construct-Shop Building	24-36	x	x	x	x	x	x	x	x	10,380	3,114	1,038,000	5-10	20-30
Parking														
Construct - Shop	24	x	x	x	x			x		9,300	3,100		2-5	5-10
Traction Power														
Substation - Yard	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Final Phase - 95th Street station to 130th Street (96+50 to 380+50/396+00)	**10 - 12**													
Signal/Communication														
Signal/Interlocking	10 - 12							x	x	--	--	--	2-5	10 - 20
Communication System	10 - 12							x	x	--	--	--	2-5	10 - 20

UPRR HRT East Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-1: 95th Street station to Beginning of Horizontal Curve at UPRR (96+60 to 132+00)	**12-36**													
Advance Work														
Signal/cross-over installation; utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	12-18	x		x	x	x		x	x	6,830	50	500	1	5-10
Retained Embankment														
Single Track	24	x	x	x	x	x	x	x	x	1,750	1,750	500	5-10	10-15
Elevated Concrete Structure														
Single Track-Rehab/Modify Existing CTA/IDOT tunnel	24	x	x	x	x	x	x	x	x	2,600	1,300	500	5-10	10-15
Elevated Steel Structure														
Single Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	4,100	7,870	2,012,500	5-10	10-15
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,090	11,917	3,701,705	5-10	10-15
Segment U-2: Horizontal Curve at UPRR (132+00 to 142+00)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	300	587	182,350	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	1,000	2,070	1,825,800	5-10	10-15
Double Track - Straddle Bent Substructure	24-30	x	x	x	x	x	x	x	x	170	457	916,100	5-10	10-15
Segment U-3: End of Horizontal Curve to Metra/CN Crossing (142+00 to 285+00)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 103rd Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - 111th Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - Michigan Avenue	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Parking														
Construct - 103rd Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - 111th Street	12	x	x	x	x			x		9,300	3,100		2-6	5-11
Construct - Michigan Avenue (2 lots)	24	x	x	x	x			x		18,600	6,200		2-7	5-12
Elevated Steel Structure														
Double Track - Hammerhead Substructure	36	x	x	x	x	x	x	x	x	32,700	63,983	19,876,150	50-100	30-35
Traction Power														
Substation - 175+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substation - 254+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

UPRR HRT East Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-4: Metra/CN Crossing to At Grade Track (285+00 to 308+83)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926		5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,300	12,327	3,829,350	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	400	897	730,320	5-10	10-15
Segment U-5: At Grade Track to 130th Street Station Options (308+83 to 359+00)	**12-36**													
Advance Work														
Utility relocation; staging	12													
At Grade														
Double Track	24-36	x	x	x	x	x	x	x	x	22,950			5-10	20-30
Access Road														
Crossing proposed tracks at 357+00	12-24	x	x	x	x			x		6,778	2,260		5-10	5-10
Bridge for access Road, Crossing at 357+00	24	x	x	x	x	x		x	x	3,105	4,610	495,000	5-11	10-15
Connector access road, West of Proposed CTA tracks	12	x	x	x	x			x		717	239		5-10	5-10
Segment U-6S: 130th Street South Station Option (359+00 to 379+27)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Station														
Construct - 130th Street South Station Option	24-36	x	x	x	x	x	x	x	x	6,773	2,653	696,305	5-10	20-30
Parking														
At South Station Option	24	x	x	x	x			x		13,900	4,700		2-5	5-10
At Grade														
Double Track	24-36	x		x	x			x	x	4,500				
Triple Track	24	x		x	x			x	x	7,700				
Access Road														
At South Station Option	12-24	x	x	x	x			x		5,778	1,926		5-10	5-10
Segment U-6W: 130th Street West Station Option (379+27 to 394+38)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Station														
Construct - 130th Street West Station Option	24-36	x	x	x	x	x	x	x	x	3,148	1,565	467,055	5-10	20-30

UPRR HRT East Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Parking														
At West Station Option (2 lots)	24	x	x	x	x			x		27,800	9,400		2-5	5-10
At Grade														
Double Track	24-36	x		x	x			x	x	12,150				
Triple Track	24	x		x	x			x	x	6,300				
Access Road														
At West Station Option	12-24	x	x	x	x			x		6,512	2,171		5-10	5-10
Bridge for Access Road, Crossing at 369+50	24	x	x	x	x	x		x	x	1,553	2,305	247,500	5-10	10-15
Segment U-7: 120th Street Yard and Shop (290+26/45+00 to 351+67/106+79)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Access Road														
Construct	12-24	x	x	x	x			x		10,977	3,659		5-10	5-10
At Grade														
Single Track	36	x		x	x	x		x	x	89,500	1,000		5-10	10-15
Double Track	36	x		x	x	x		x	x	8,100			5-10	10-15
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926	500	5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	2,100	4,109	1,276,450	5-10	10-15
Shop Facility														
Construct-Shop Building	24-36	x	x	x	x	x	x	x	x	10,380	3,114	1,038,000	5-10	20-30
Parking														
Construct - Shop	24	x	x	x	x			x		9,300	3,100		2-5	5-10
Traction Power														
Substation - Yard	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Final Phase - 95th Street station to 130th Street (96+50 to 379+70/394+53)	**10 - 12**													
Signal/Communication														
Signal/Interlocking	10 - 12							x	x	--	--	--	2-5	10 - 20
Communication System	10 - 12							x	x	--	--	--	2-5	10 - 20

UPRR HRT West Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-1: 95th Street Station to Beginning of Horizontal Curve at UPRR (96+60 to 132+00)	**12-36**													
Advance Work														
Signal/cross-over installation; utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	12-18	x		x	x	x		x	x	6,830	50	500	1	5-10
Retained Embankment														
Single Track	24	x	x	x	x	x	x	x	x	1,750	1,750	500	5-10	10-15
Elevated Concrete Structure														
Single Track-Rehab/Modify Existing CTA/IDOT tunnel	24	x	x	x	x	x	x	x	x	2,600	1,300	500	5-10	10-15
Elevated Steel Structure														
Single Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	4,100	7,870	2,012,500	5-10	10-15
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,090	11,917	3,701,705	5-10	10-15
Segment U-2: Horizontal Curve at UPRR (132+00 to 142+43)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	600	1,174	364,700	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	1,000	2,070	1,825,800	5-10	10-15
Double Track - Straddle Bent Substructure	24-30	x	x	x	x	x	x	x	x	340	951	1,581,000	5-10	10-15
Segment U-3A: End of Horizontal Curve to Prairie/UPRR Crossing (142+43 to 275+00)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 103rd Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - 111th Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - Michigan Avenue	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Parking														
Construct - 103rd Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - 111th Street	12	x	x	x	x	x		x	x	9,300	3,100		2-5	5-10
Construct -Michigan Avenue (2 lots)	24	x	x	x	x			x		18,600	6,200		2-5	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	36	x	x	x	x	x	x	x	x	29,700	58,113	18,052,650	50-100	30-35
Traction Power														
Substation - 180+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substation - 260+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

UPRR HRT West Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-3B: Prairie/UPRR crossing to Metra/CN Crossing (275+00 to 287+20)	**24-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track -Hammerhead Substructure	36	x	x	x	x	x	x	x	x	1,200	2,438	729,400	50-100	30-35
Double Track - Straddle Bent Substructure	36	x	x	x	x	x	x	x	x	1,020	3,014	3,948,600	50-100	30-35
Segment U-4: Metra/CN Crossing to At Grade Track (287+20 to 311+02)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926		5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	5,700	11,153	3,464,650	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	400	895	730,320	5-10	10-15
Segment U-5: At Grade Track to 130th Street Station Options (311+02 to 361+19)	**12-36**													
Advance Work														
Utility relocation; staging	12													
At Grade														
Double Track	24-36	x	x	x	x	x	x	x	x	23,400			5-10	20-30
Access Road														
Crossing proposed tracks at 360+00	12-24	x	x	x	x			x		6,778	2,260		5-10	5-10
Bridge for Access Road, Crossing at 360+00	24	x	x	x	x	x		x	x	3,105	4,610	495,000	5-10	10-15
Connector access road, West of Proposed CTA tracks	12	x	x	x	x			x		717	239		5-10	5-10
Segment U-6S: South 130th Street Station Option (361+19 to 381+46)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Station														
Construct - 130th Street South Station Option	24-36	x	x	x	x	x	x	x	x	6,773	2,653	696,305	5-10	20-30
Parking														
Construct - 130th Street South Station Option	24	x	x	x	x			x		13,900	4,700		2-5	5-10
At Grade														

UPRR HRT West Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Double Track	24-36	x		x	x			x	x	5,400				
Triple Track	24	x		x	x			x	x	7,700				
Access Road														
At South Station Option	12-24	x	x	x	x			x		5,778	1,926		5-10	5-10
Segment U-6W: West 130th Street Station Option (381+46 to 396+57)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Station														
Construct - 130th Street West Option	24-36	x	x	x	x	x	x	x	x	3,148	1,565	467,055	5-10	20-30
Parking														
Construct - 130th Street West Option (2 lots)	24	x	x	x	x			x		27,800	9,400		2-5	5-10
At Grade														
Double Track	24-36	x		x	x			x	x	13,050				
Triple Track	24	x		x	x			x	x	5,600				
Access Road														
At West Station Option	12-24	x	x	x	x			x		6,512	2,171		5-10	5-10
Bridge for Access Road, Crossing at 372+00	24	x	x	x	x			x		1,553	2,305	247,500	5-10	10-15
Segment U-7: 120th Street Yard and Shop (292+45/45+00 to 353+86/106+79)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Access Road														
Construct	12-24	x	x	x	x			x		10,977	3,659		5-10	5-10
At Grade														
Single Track	36	x		x	x	x		x	x	89,500	1000		5-10	10-15
Double Track	36	x		x	x	x		x	x	8,100			5-10	10-15
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926	500	5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	2,100	4,109	1,276,450	5-10	10-15
Shop Facility														
Construct-Shop Building	24-36	x	x	x	x	x	x	x	x	10,380	3,114	1,038,000	5-10	20-30
Parking														
Construct - Shop	24	x	x	x	x			x		9,300	3,100		2-5	5-10
Traction Power														
Substation - Yard	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

UPRR HRT West Side Option Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Final Phase - 95th Street Station to 130th Street (96+50 to 382+30/396+50)	**10 - 12**													
Signal/Communication														
Signal/Interlocking	10 - 12							x	x	--	--	--	2-5	10 - 20
Communication System	10 - 12							x	x	--	--	--	2-5	10 - 20

Halsted Street HRT Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment H-1: 95th Street Station to Beginning of Horizontal Curve at Halsted (96+60 to 158+00)	**12-36**													
Advance Work														
Signal/cross-over installation; utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	12-18	x		x	x	x		x	x	6,830	50	500	1	5-10
Retained Embankment														
Single Track	24	x	x	x	x	x	x	x	x	1,750	1,500	500	5-10	10-15
Elevated Concrete Structure														
Single Track-Rehab/Modify Existing CTA/IDOT tunnel	24	x	x	x	x	x	x	x	x	2,600	1,300	500	5-10	10-15
Elevated Steel Structure														
Single Track-Hammerhead Substructure	24	x	x	x	x	x	x	x	x	2,381	7,870	2,012,500	5-10	10-15
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	8,344	26,820	8,625,155	5-10	10-15
Segment H-2: Horizontal Curve at Halsted (158+00 to 168+00)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track -TPG, Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	1,000	2,070	1,825,800	5-10	10-15
Double Track - Straddle Bent Substructure	24-30	x	x	x	x	x	x	x	x	340	914	1,664,200	5-10	10-15
Segment H-3: End of Horizontal Curve to 119th Street Station (168+00 to 285+00)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 103rd Street	24-36	x	x	x	x	x	x	x	x	2,903	4,052	4,764,000	5-10	20-30
Construct - 111th Street	24-36	x	x	x	x	x	x	x	x	2,903	4,052	4,764,000	5-10	20-30
Parking														
Construct - 103rd Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - 111th Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	12,600	23,814	7,658,700	50-100	30-35
Double Track - Straddle Bent Substructure	24-36	x	x	x	x	x	x	x	x	13,104	32,261	45,252,480	50-100	30-35
Traction Power														
Substations - 101st Street	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substations - 110th Street	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

Halsted Street HRT Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment H-4: 119th Street station to Vermont Avenue station (285+00 to 367+30)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 119th Street	24-36	x	x	x	x	x	x	x	x	2,903	4,052	4,764,000	5-10	20-30
Construct - Vermont Avenue	24-36	x	x	x	x	x	x	x	x	3,363	3,914	4,741,000	5-10	20-30
Parking														
Construct - 119th Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - Vermont Avenue	24	x	x	x	x			x		13,900	4,700		2-5	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	8,400	15,876	5,105,800	50-100	30-35
Double Track - Straddle Bent Substructure	24-36	x	x	x	x	x	x	x	x	8,736	21,507	30,168,320	50-100	30-35
Triple Track - Straddle Bent Substructure	12-24	x	x	x	x	x	x	x	x	1,260	3,420	5,875,200	50-100	30-35
Traction Power														
Substations - 118th Place	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substations - 126th Street	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Segment H-5: 119th Street Yard and Shop (299+47/500+00 to 306+96/1014+64)	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	24-36	x		x	x	x		x	x	87,000	1,000		5-10	10-15
Double Track	24-36	x		x	x	x		x	x	3,150			5-10	10-15
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	3,709	1,242	500	5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	3,300	6,237	2,005,850	5-10	10-15
Double Track - Straddle Bent Substructure	24-36	x	x	x	x	x	x	x	x	2,520	6,204	8,702,400	5-10	10-15
Parking														
Construct - Shop	24	x	x	x	x			x		9,300	3,100		2-5	5-10
Shop Facility														
Construct-Shop Building	24-36	x	x	x	x	x	x	x	x	8,075	2,423	807,500	5-10	20-30
Access Road														
Construct	12-24	x	x	x	x			x		7,041	2,347		2-5	5-10
Traction Power														
Substations - Yard	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

Halsted Street HRT Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Final Phase - 95th Street Station to 129th Street (STA 96+50 to 367+00)	**10 - 12**													
Signal/Communication														
Signal/Interlocking	10 - 12							x	x	--	--	--	2-5	10 - 20
Communication System	10 - 12							x	x	--	--	--	2-5	10 - 20

Appendix B
2014-2015 Red Line Extension Project Update

2014–2015 Red Line Extension Project Update

From 2012–2014, CTA evaluated benefits and impacts of four alternatives: the No Build Alternative, the Bus Rapid Transit Alternative (along Michigan Avenue), the Union Pacific Railroad (UPRR) Rail Alternative, and the Halsted Alternative. CTA evaluated three options of the UPRR Rail Alternative: Right-of-Way Option, East Option, and West Option. CTA also evaluated two options of the UPRR Rail Alternative 130th Street station: a South Station Option and a West Station Option. Based on the project description provided in Section 2 of this technical memorandum, CTA analyzed the impacts of these alternatives and station options. The benefits and impacts are included in the technical memoranda prepared in 2012–2014.

In August 2014, based on the technical analysis and public input, CTA announced the NEPA Preferred Alternative—the UPRR Rail Alternative. Additional conceptual engineering was conducted on the UPRR Rail Alternative to refine the East and West Option alignments. In addition, CTA is considering only the South Station Option of the 130th Street Station.

In late 2014 and early 2015, CTA conducted additional engineering and revised assumptions on the East and West Options to refine the alignments. The refinement of the East and West Options consisted of the following items:

- For the segment of the alignment along I-57, CTA shifted the proposed alignment from the median of I-57 to the north side of I-57 within the existing expressway right-of-way. The construction would be less complex, safer for construction workers, and have a shorter duration. The shift would also allow for fewer impacts to Wendell Smith Park for the East Option, and would allow for no permanent impacts to Wendell Smith Park for the West Option.

- CTA modified the curve speeds as the alignment heads south from I-57 along the UPRR tracks. The curve speed for both the East and West Options would be 35 mph.

- CTA shifted the East Option alignment near 103rd Street station to minimize impacts to Block Park and the Roseland Pumping Station.

- CTA modified the curves south of 103rd Street for both the East and West Options to 55 mph to maximize the train speed.

- CTA refined the layout of the 120th Street yard and shop to optimize yard operations. The refined layout of the yard would accommodate 340 train cars.

The refinement of the East and West Option alignments minimizes potential impacts to parks while providing flexibility for future design phases. The Draft Environmental Impact Statement contains the benefits and impacts of the refined East and West Option alignments and supersedes information presented in other chapters of this technical memorandum.

The refined East and West Option alignments would have no additional or different impacts from those described in the technical memoranda for the following resource areas: construction, transportation, land use and economic development, historic and cultural resources, safety and security, hazardous materials, indirect and cumulative, air quality, floodplains, vegetation and wildlife habitat, threatened and endangered species, and geology and soils.